

# Beyond information behaviour:

Evidence based practice as sense-making in public health

Jennifer Rose Ford

UCL

PhD (Department of Information Studies)

I, Jennifer Rose Ford confirm that the work presented in this thesis is my own.  
Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

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## **Abstract**

Recent decades have seen a trend towards evidence based practice (EBP) in public health, which it is thought will ensure improvements in health by emphasising the use of robust evidence. Library and Information professionals can support EBP by understanding the behaviour of their users in relation to evidence. This thesis explores how public health practitioners use information for sense-making in their work. The conceptualisation of sense-making is derived from Brenda Dervin's sense-making methodology, which provides a holistic understanding of 'information use'. This approach is advantageous in supporting conceptualisation of information use as a social and communicative behaviour where views and perceptions of other people affect the behaviour of the individual. This contrasts to the approach taken by previous studies of information behaviour in public health, which have mainly been concerned with use of information services and systems.

The thesis addresses research questions on what situations and gaps in understanding are experienced by public health workers, how they use information to make sense of those situations and progress their work, and what barriers they experience during sense-making. Data from semi-structured interviews and vignettes with a group of UK based public health practitioners is analysed using Grounded Theory methods, to create a substantive theory of how sense-making is undertaken by the participants. This theory provides an understanding of how participants perceive, interact with and construct public health evidence. An acceptance of the concept of EBP as a way of interacting with information is found to be the core driver behind the way in which participants interact with information and with other people. EBP integrates elements of participants' perceptions of evidence and how these perceptions, alongside other elements of knowledge and past experience affect the participants' ideas about the potential usefulness of information as part of strategies to influence others.

## **Impact statement: Future directions for information behaviour research**

The most important potential impacts for the present research are likely to take place in the field of academic research into information behaviour. These impacts can be derived from the way in which this thesis draws attention to the importance of social constructs as factors which influence information use, and the application of previously under-used data gathering techniques, shown here to be valuable in generating insights about information use.

### **Highlighting the influence of social constructs on information use**

The main output of this thesis is a process of sense-making, which the participants of this research undertake when interacting with information and other people. This process draws attention to the importance of communication and social constructs as elements which affect information use. The importance of such phenomena may have been over-looked in previous public health information behaviour research. The information behaviour literature reviewed during the course of this thesis suggested a reliance on survey methods to collect data, with little appreciation of the importance of individuals' perceptions of themselves as members of social groups as a factor influencing behaviour. This in turn suggests that future researchers who wish to study the way in which individuals in public health (and in other domains), must pay more attention to the social and communicative nature of these interactions. This thesis therefore has the potential to impact future research in information use by proposing new directions for qualitative data gathering. The thesis highlights that the inclusion of questions in interviews and focus groups, on the way in which individuals communicate their ideas, and what purposes and benefits these communications have for the individuals involved may generate new insights into behaviour.

### **The potential value of data gathering through vignettes for future study of information behaviour**

Other impacts for future research exist in the demonstration of the value of vignette techniques as methods of collecting real-time data on information use. Information use in

general is known to be under-researched, and this may in part be due to the difficulty in observing a process which may be largely cognitive and therefore not easily observed by a researcher. The vignette technique used to gather data in the present research was instrumental in developing an understanding of the effect that individual knowledge and experiences have on interactions with new information, and on the content of these interactions through evaluation of relevance and authority of information. Such techniques may therefore also be useful for those who wish to research specifically into the way in which individual library and information service users determine relevance and authority of information. This impact could be realised through the publication of a methods paper based on this thesis, which, if accepted by a peer reviewed journal with high impact factor, could reach an international audience.

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# 1 Introduction

Public health systems and functions are responsible for ensuring the continued prosperity and well-being of whole populations. They provide and maintain conditions in which populations can remain healthy and free of disease (World Health Organization, 2014). This includes considerations related to infrastructure of communities, from water and sewerage systems which have an obvious function in providing basic sanitation conditions necessary to maintaining health, to the less immediately obvious need to provide populations with access to facilities that give them the option to lead physically active lifestyles. Recent years have seen public health strive to become more evidence based, in common with clinical medicine. The nature of public health as a domain which deals with whole populations means that public health policy has been recognised as an area which should be based on evidence. It has been said that the use of evidence is key to ensuring good population health (Katikireddi et al., 2011, Macintyre, 2003). Definitions of evidence based public health also refer to the use of information: *“Evidence based public health can be defined as a public health endeavour in which there is an informed, explicit, and judicious use of evidence that has been derived from any of a variety of science and social science research and evaluation methods”* (Rychetnik et al., 2004 p. 538). This demonstrates the importance of evidence based practice in public health, and also suggests that engaging in evidence based public health practice involves using evidence and information to help determine actions. Roles have emerged for librarians as facilitators and enablers of evidence based practice both in clinical medicine and in public health, indicating that the profession has a stake in understanding evidence based practice and supporting it. In parallel to this, librarians have also set themselves to study the information behaviour of public health workers, mainly focusing on their information needs and seeking abilities, as will be indicated in later chapters of this thesis.

Information use, recognised as a sub-domain of information behaviour (Wilson, 1999)

continues to be the subject of research - within the last 15-20 years research into information use has included the development of integrated models of behaviour that incorporate elements of information use alongside seeking, to create general information behaviour models, for example see Godbold (2006) and (Savolainen, 2016). There have been efforts in integrate and incorporate cognitive elements of information into theories about this behaviour, drawing on disciplines such as evolutionary psychology (Spink and Cole, 2006). There have also been numerous investigations into information use in different areas of work and life, ranging from use of information in government (Crawford et al., 2008) to use of information by marketing professionals (Du, 2014). However, as this thesis will demonstrate, there has been little research into information use in the public health workforce.

If librarians are to support evidence based public health practice effectively, it is suggested that there is a need to understand more about information use behaviour in this context, filling what is currently a gap in the available research on this area. The present research attempts to make a contribution to filling this gap, by researching information use behaviour in a group of UK based public health workers.

During the course of this research, and the journey toward developing a process through which public health workers engage in evidence based practice, a number of questions are addressed. The thesis considers what is already known about information behaviour and information use in public health, on the basis of previous research. Through the course of the research, the range of existing models of information behaviour developed by other researchers, and existing definitions and conceptualisations of information use are considered. 'Information', 'evidence' and 'use' are complicated concepts, and have multiple meanings, which this research explores. The ultimate aim and output of this research is the development of a substantive theory of evidence based practice, which this group of participants are thought to engage in. This is achieved through semi-structured interviews and vignettes with public health workers, and the use of Grounded Theory research methods to support theory development. The remainder of this chapter sets out the structure of this

thesis, providing a brief chapter by chapter overview of how these research goals were addressed through the various stages of the research.

## **1.1 Structure of this thesis**

This thesis is, of necessity presented as a linear sequence of events, described chapter by chapter. However, these chapters are not representative of a strict chronology of events in the research. Traditionally, a piece of primary empirical research might be expected to follow a linear pattern beginning with a literature review, followed by a research methods chapter, and finishing with chapters on data collection, analysis and conclusions. This sequence would usually roughly represent the order of events in the research. Although the thesis does present chapters in this order, the development of some aspects of the research was more iterative than is suggested by the sequence of chapters. This is in part due to the use of Grounded Theory methods in the research and mainly affects the literature review, and function of literature in the research. The literature review for this research is spread over chapters 2, 3 and 4. The order in which these chapters are presented is roughly analogous to the order in which the research was carried out – this is intended to show how the research direction and use of sense-making methodology developed as a result of the literature review, as the outcome of this process was important in shaping the research direction in the early stages.

The place of the literature review in Grounded Theory is known as a slightly controversial area, with some Grounded Theory 'purists' advocating that no review should be carried out as this can result in pollution of a researchers approach to data analysis by pre-conceived ideas gleaned from the literature (Dunne, 2011). At the same time it is recognised that some degree of literature review is useful and necessary for PhD students because of the need to ensure that research is not simply repeating something which has already been done (Dunne, 2011). The place of the literature review in the present research and how the review was carried out is discussed in more detail in chapter 2, as this chapter presents the first approach to the literature in this thesis. The same logic on the place of the literature review

in Grounded Theory research as is presented in chapter 2 also applies to the literature reviews in chapters 3 and 4. The use of Grounded Theory in this research, including the role of the literature review in Grounded Theory research is discussed in chapter 5, as part of the methodology as a whole. This allows the role of the literature review to appear in context as part of the overall approach to using Grounded Theory in this research.

The original research proposal suggested an examination of the information behaviour in public health, with a view to developing a model of this behaviour (see appendix 1 for original research proposal). The thesis therefore begins with a literature review of the substantive area within which the work was to take place, looking for research on information behaviour of public health workers. This part of the review is presented in chapter 2, its purpose being to provide a map of the existing literature - to ensure awareness of the current state of information behaviour research in public health and to identify areas where there was less or no evidence and provide a focus for the present research. The review described in chapter 2 identified that information use was one aspect of information behaviour that seemed to have received less attention than, for example information needs, or information seeking. This resulted in a desire to focus on information use as the specific area of study for the present research. The finding, during this review, of one or two pieces of research belonging to another research area, research utilization suggested, in combination with the researcher's existing knowledge of this domain that a review of research utilization literature in public health would also be necessary. This second part of the review is presented in chapter 3.

Completion of these literature reviews highlighted what were perceived to be a number of inadequacies in existing research relevant to information use behaviour and research utilization in public health. Of the information behaviour studies, there were few qualitative studies and therefore few studies that could provide detailed insight into individual behaviour and processes of information use. Quantitative studies from this area tended to focus on usage of channels of information e.g. collecting statistics on usage of various sources of

information. The research utilization studies tended to focus specifically on academic research evidence, rather than information more generally. Although there were more qualitative studies from this area, there was a tendency toward the use of a preconceived framework of symbolic, conceptual and instrumental categorisations to measure and understand information use.

The literature review highlighted several things: that there had been little research into public health information use conducted by library and information professionals; that there were a wide variety of approaches to measuring and conceptualising information use in public health research utilization literature, and that often information use was not clearly conceptualised in this research, or that conceptualisations were restrictive. This sparked a desire to try and carry out research which would take a more holistic approach to information use in public health. The research was intended to be holistic on two fronts - firstly it would not be restricted to finding out about only one type of information use, e.g. written observable use. Secondly it would not make use of any existing categorisations of information use. In this way, it was hoped that the door would be left open for public health workers involved in the study to share more freely the variety of different types of information that they used, what happened as a result of this, and in what situations.

The variety of conceptualisations and approaches to measuring information use demonstrated through the literature review also indicated that before any further research into information use could be carried out some thought needed to be given to what was meant by information use. Chapter 4 contains a literature review which explores the theoretical and conceptual aspects of information use. This chapter, in combination with the findings from chapters 2 and 3 was instrumental in forming the required holistic conceptualisation of information use. There were several reasons for undertaking this stage of work. Firstly, the idea of developing a model of information behaviour for public health workers (as discussed in the original proposal) meant that it would be necessary to examine existing information behaviour models. Secondly an understanding of the theory and

concepts of information behaviour and information use were helpful in understanding and analysing the findings of the literature reviews shown in chapters 2 and 3. This literature review was helpful in thinking through what was actually meant by information use in the research discussed in chapters 2 and 3, what *could* be meant by information use, and whether existing literature seemed to capture and study the full complexity of meaning. Thirdly, the theoretical review helped to support the development of the protocol for the research, an understanding of what was to be measured (information use) being necessary before any plan on how to measure this could be developed.

Chapter 5 presents the methodology for the thesis, including the role of sense-making within this methodology. This chapter on the methodology of the research appears in sequence following the literature review of chapters 2 and 3 and the review of conceptualisations of information use presented in chapter 4 because the findings of those chapters were an important influence on the development of the methodology. The literature review documented in chapters 2 and 3 indicated that a more holistic conceptualisation of information use than had been taken in previous research might generate new insights into this behaviour. Chapter 4 concluded with the argument that sense-making provided a holistic conceptualisation of information use that could avoid the problems that may arise with narrower conceptualisations of information use. Chapter 5 follows on from this by discussing Dervin's sense-making methodology in more detail and outlining how this methodology was applied in the thesis.

The use of sense-making methodology also influenced the specific research questions addressed in the thesis, and this is why the research questions appear in chapter 5. These questions are framed within the sense-making assumptions that individuals encounter gaps in their reality which require them to use information to attempt to bridge those gaps and make sense of their reality. As the research then moved into the stage of planning the research protocol, a further additional literature review was carried out to support protocol development. In particular, looking for materials on sense-making methods and empirical



studies of information use was useful. Both helped to inform the data collection method of the research.

Chapter 6 presents the start of the data analysis. This first chapter consists of a summary about the participants, to set the scene for the interpretive and conceptual analysis of their interviews. Qualitative semi-structured interviews were the method of data collection, and the interviews were structured around asking participants to describe a situation or task that they had carried out in their work. The participants were able to choose any task or situation from their work for discussion, and as such interviews were very open.

Chapters 7 and 8 describe the process of coding data from the interviews. As the research design used Grounded Theory methods, several stages of coding were required – open, selective and theoretical coding. Chapter 7 presents the open and selective coding stages. The list of open codes created is provided, alongside descriptions of how each code was developed including the criteria by which it was decided that different participant quotations belong together under the same open code. The grouping of the open codes together into the themes or clusters sometimes known as selective codes in Grounded Theory is also described.

Chapter 8 follows on from this to present the development of a substantive theory of behaviour through the exercise of theoretical coding. In this chapter, the relationships between the selective codes described in chapter 7 are explored and discussed, with support from existing literature on the various concepts which seemed to be important to understanding the participants' experiences. The core category which integrates and explains the patterns of behaviour noted is also described and explained. The core of the theory is the idea that evidence based practice is a form of sense-making in public health, as experienced by the participants in this research.

The final chapter of the thesis reflects back on the development of the theory, and what has been learnt about meanings and conceptualisations of information, knowledge, evidence

and the various other concepts which became important to understanding evidence based practice. This includes reflections on how this research compares to existing information behaviour research, and what it can contribute to advancing understanding of how public health workers interact with and experience information.

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## 2 Information behaviour in public health

This research began with the aim of finding out more about information behaviour in public health, and particularly how information behaviour as defined in the field of Library and Information Studies might help to understand the role that information plays in public health work. The original proposal for this thesis (see appendix 1), which was drafted prior to beginning the research, set out to profile the information behaviour of the public health workforce, with a potential focus on behaviour of third sector individuals engaged in public policy work. The intention was to develop a model for the information behaviour of this group. This was in part driven by the awareness that there was relatively little formal public health information behaviour research already in existence, an awareness gained through knowledge of previous research and personal involvement in some research on this topic (Revere et al., 2007, Ford and Korjonen, 2012).

A first step towards conducting research that it was initially hoped would help to develop this behaviour model was to carry out a literature review. Although two previous reviews on specific areas of information behaviour in public health were known to have been carried out, there were acknowledged limitations to these reviews. In one case, the review in question (Revere et al., 2007) was, by the time at which this research began in late 2013, over 5 years old. In the other case, a more recent review, which the researcher had been involved in (Ford and Korjonen, 2012), the review had been limited in terms of scope of the search by lack of access to a number of subscription databases that would have been useful sources. In addition, both reviews had primarily been focused on information needs. It was therefore decided that a further review with a broader scope would be helpful as background for the proposed research, and to help refine the direction of the research.

## **2.1 Grounded theory and the place of the literature review**

The theory-building purpose originally associated with the research had led to the idea that Grounded Theory might be an appropriate methodology for data collection and analysis. A brief discussion of the appropriateness of Grounded Theory where the intent is to develop behavioural theories was included in the original research proposal. Those familiar with Grounded Theory will be aware of the debate around the place and purpose of literature reviews in Grounded Theory studies, and may question whether it is appropriate to begin this research with a literature review.

Grounded Theory uses methodological approaches which attempt to avoid imposing any preconceived ideas which the researcher might possess on the data during collection and analysis. The openness of this approach has been interpreted to mean that those attempting to carry out Grounded Theory research should avoid undertaking any literature review prior to data collection, because this might introduce researchers to preconceived ideas and therefore unduly influence their interpretation of the data they collect (Urquhart, 2007). It would therefore seem to anyone supporting this idea, that it would not be appropriate to conduct any kind of literature review at the start of a Grounded Theory study.

However, counter-arguments supporting the usefulness of a literature review at the start of a Grounded Theory study have also been made. These counter-arguments include the ability to use the literature review to determine whether any existing similar studies have already been carried out (Dunne, 2011). The purpose of mapping the existing studies that had already been carried out on information behaviour in the public health workforce was the main reason to carry out a review in the present case. A certain amount of relevant literature on information behaviour of the public health workforce was known to exist when the original research proposal was drafted (as discussed above), but it was recognised that further research would likely come to light through additional literature search and review.

The literature searches and reviews presented in chapters 2-4 of this thesis have helped to inform the development of this research, from aspects of the orientation within a research paradigm through to the use of sense-making as a basis for interviews. The injunction against prior literature review seems to have its origin in the idea that the Grounded Theory researcher should try to avoid imposing any preconceived ideas (which they might have as a result of a literature review) on the research data during analysis (Ramalho et al., 2015). However, it has also been pointed out that "*[...] there is a difference between an open mind and an empty head. To analyze data researchers draw upon accumulated knowledge. They don't dispense with it.*" (Dey, 1993 p.63).

In fact, the injunction against an initial literature review in Grounded Theory has been presented as a misconception of the method (Urquhart, 2007). If the reason for avoiding a literature review is to avoid contamination of the data, it is suggested that this pitfall can be circumnavigated by the researcher endeavouring to maintain a degree of self-awareness - appreciating theories without imposing them on the data (Urquhart, 2007). It is also worth pointing out that, given that the person conducting this research had already previously been involved in a literature review on a similar topic (Ford and Korjonen, 2012), and had worked in an information service in a public health organisation, it would have been impossible to avoid an approach to the subject which was not informed by some pre-existing knowledge and experience. It is well known that since its original development in the 1960s, Grounded Theory has split into several separate schools of thought with some differences with regard to exact application of methodology (Ramalho et al., 2015). Not all of these schools of thought strictly mandate total avoidance of relevant literature prior to research. Corbin and Strauss for instance recognise the researcher's pre-existing knowledge and experience as a valuable tool which they bring to the research, and suggest engaging with this knowledge, and with other literature through the research process (Strauss and Corbin, 1998). Therefore, the fact that a literature review has been carried out in this instance should not be

seen as a barrier to the subsequent use of Grounded Theory, but as something that may help to benefit the analysis.

The objectives of the literature review presented in this chapter were as follows:

1. To find existing recent primary research on the information behaviour of the public health workforce carried out either in the UK, or in similarly economically developed countries.
2. To use the research found to map research coverage against the various sectors of the public health workforce, highlighting which groups have yet to be studied.
3. To use the research found to map coverage against existing models of information behaviour, such as Wilson's models (Wilson, 2000, Wilson, 1999) , in order to determine whether certain aspects of information behaviour in public health are more studied than others.
4. To synthesise the findings of the existing research to determine whether any consistent themes exist regarding information behaviour in public health and whether different sectors of the public health workforce exhibit different information behaviours.
5. To examine the methodologies that have been used in existing research, with a view to highlighting suitable methods of study, and problems that have been encountered by other researchers.

## **2.2 Literature review search strategy and method**

A literature search for references on information behaviour research in public health was carried out via a text word search strategy applied in a variety of relevant health, medical and information science databases to identify relevant references. The following text word terms were used to search the bibliographic databases Medline, Embase, PSYCInfo, Web of Knowledge, Scopus, LISA, Library and Information Science Source and CINAHL.

“public health”

AND

“information behavio?r” or “information use” or “information search\*” or “information seek\*” or  
“information need\*” or “information access\*” or “information barrier\*”

NOT

Patient or carer or sufferer or child\* or parent\* or men or women

Limits applied: English language only, 1983 - present

The concepts included in Wilson’s definition of information behaviour were used to help construct the search strategy. Wilson defines information behaviour as:

*“the totality of human behaviour in relation to sources and channels of information, including both active and passive information seeking and information use...it includes face-to-face communication with others, as well as the passive reception of information as in, for example, watching TV advertisements without any intention to act on the information given”*  
(Wilson, 2000 p.49)

Wilson’s model of information behaviour includes the terms ‘information use’, ‘information need’ and ‘information seeking’ (Wilson, 2000). These terms, with the umbrella term ‘information behaviour’ formed the basis of the search. Additional terms relating to information behaviour were identified from literature the author was already aware of, and added to the search strategy accordingly. Construction of an adequate search strategy for this topic presented some difficulties, chiefly in databases (e.g. Medline, Embase) where a systematic searcher would normally seek to make use of subject headings or thesaurus terms. Concepts such as ‘information behaviour’ and ‘information seeking’ are not particularly well indexed in databases such as Medline, which, with its indexing of health literature was considered an important source for literature searching in this research. For instance, no subject heading term for ‘information behaviour’ exists in the Medline thesaurus – the searcher is instead directed towards the term ‘information seeking behaviour’, which,



on closer inspection is found to only have existed in the database since 2010<sup>1</sup>. Other aspects of information behaviour fare even less well in terms of how they are catered for by database thesauri – e.g. there is no thesaurus term for 'information use' in the Medline thesaurus. Existing terms available such as 'information theory' and 'information systems' appeared to be too broad to be of use to the search. A decision was therefore taken to rely on text word searching for the search strategy. This may have limited the search in the sense that it put additional pressure on the searcher to try to ensure all possible variants of search terms are included in the search. The end result of relying solely on text word terms is a slight increase in the risk of missing some relevant research. However, citation searching was used as a back-up search technique in an attempt to mitigate against the risk of this problem and to identify any additional literature not picked up by the database search. The process of citation searching used during this review is described in further detail below. All references found through the search were downloaded into EndNote reference management software. The same software was then used to remove duplicate references, and to sort through results to identify relevant articles according to pre-defined inclusion and exclusion criteria (see below for criteria used).

A total of 1,671 references were retrieved, with 1,216 remaining after the removal of duplicates. A breakdown of the number of results found from searching each database is provided in table 2-1 below.

**Table 2-1: Breakdown of results found during literature search on information behaviour in public health**

<b>Database</b>	<b>Date searched</b>	<b>Notes</b>	<b>Number of results</b>
Medline (Ovid)	02/02/2014	Text word search in abstract	165
Embase (Ovid)	02/02/2014	Text word search in abstract	188

<sup>1</sup> See <https://www.ncbi.nlm.nih.gov/mesh/?term=information+behavior>

PsycInfo (Ovid)	02/02/2014	Text word search in abstract	47
Web of Knowledge	02/02/2014	Topic search	587
Scopus	02/02/2014	Text word search in title abstract & keyword	555
LISA	02/02/2014	Text word search in abstract	36
Library & Information Science Source	02/02/2014	Text word search in abstract – limiting by language not possible	37
CINAHL	02/02/2014	Text word search in abstract	56

Following the removal of duplicates, the remaining references were sifted against the inclusion and exclusion criteria listed below, based on the information contained in the reference title and abstract. References not meeting the inclusion criteria were discarded at this stage. The objective of the search was to determine the extent to which the information behaviour of the public health workforce had been studied through primary research. Therefore, secondary research articles were not included. Articles that evaluated or presented information services or projects aimed at the public health workforce were discarded unless they included findings of information needs research carried out as preparation for the information service or product described. Where relevance to inclusion criteria was unclear from the article abstract, or an abstract was unavailable, the full text of the reference was obtained in order to make a final decision on inclusion/exclusion in the review. The diversity of the public health workforce, and the extent to which it overlaps with

other sectors in health and social care made it necessary to employ criteria to differentiate articles of relevance to this research from those which, for example, focussed on information behaviour in clinical medical settings. Accordingly, one of the inclusion criteria applied when sifting the results of the search was that any article included had to use the term 'public health' to describe either the population of individuals studied by the research, or the setting in which they worked.

### **Inclusion criteria**

- Primary research into information behaviour of public health workforce
- Uses term "public health" to describe either the study population or setting in which the research was carried out
- Articles on public health IB in developed countries – Europe, Australia, New Zealand, North America
- Articles focused on human information behaviour of individuals, rather than looking at behaviour of networks or organisations as a whole. For this reason, some pieces of research focusing on organisational network analyses where the findings present little or no discussion of behaviour of individuals are not included.

### **Exclusion criteria**

- Articles presenting or evaluating public health information services where there is no analysis of public health information behaviour
- Articles focusing on medical/health students
- Articles dealing with information behaviour of patients/families/the general public
- Descriptions of marketing/advertising campaigns for public health resources
- Articles on information behaviour and services in developing countries
- Papers on decision support/evaluation frameworks
- Articles on information systems for disease/outbreak surveillance
- Articles focused on technology and systems in public health information provision

- Articles focused on communication of public health professionals with the public and health messaging to the general public

Following completion of sifting by title and abstract, 29 references remained. A Google Scholar search yielded an additional 7660 results. A sift of the first 250 results identified 2 additional articles, “Information needs of rural health care practitioners in Hawaii” (Lundeen et al., 1994) and “Information needs of the frontline public health workforce” (Rutland and Smith, 2010). This resulted in a final total of 31 references retrieved through the database search.

In order to find additional research that had not been retrieved through the database search, references lists of the 31 articles remaining after sifting were scanned. Full text of articles that appeared potentially relevant based on their title were retrieved. Additional articles were then judged against the same inclusion and exclusion criteria set out above. A general internet search (Google search) was also carried out at this stage to identify further material, such as grey (non-commercially published) literature not usually indexed by the bibliographic databases searched in step 1. These additional forms of searching identified a further 5 references, meaning that the final total of references found through this part of the literature review was 36.

## **2.3 Public health information behaviour in Library and Information**

### **Science research**

The general consensus among those carrying out research which falls within the wider domain of information behaviour in public health professionals seems to have been that there is little previous research on information behaviour specifically for this group (Wallis, 2006, Revere et al., 2007). It appears that in many cases, the aims of the research that has been conducted have focused on the more specific sub-domains of information needs,

information seeking and barriers to information, with a smaller number of studies touching on information use.

A review of the history of information behaviour research in Library and Information Science noted that many early user studies were in fact studies of information systems use, looking at the use of library services and information sources rather than what was done with the content of those sources (Wilson, 2000). Many studies of public health worker information needs, seeking, barriers and use originating from the LIS discipline have followed this model of user studies, as many of them have used quantitative methods. This has resulted in data that is focused on counting numbers of users and numbers of uses. Examples of this type of research include Turner et al. (2009), Harris et al. (2014), Hollander and Martin (1999), Harwell et al. (2008), Le (2013), Mortensen et al. (2013), Dobbins et al. (2001), Scheiber et al. (1999). Information needs and information seeking in particular have been the focus of much of the existing work, including literature reviews on this topic (Revere et al., 2007). The knowledge on the information behaviour sub-domains of needs, seeking, barriers and use for public health, which has been developed through this existing work is summarised below.

### 2.3.1 Information needs

One striking finding which emerges from studies of information needs of the public health workforce is the sheer variety of types of information that are mentioned. This may be a direct result of the diversity of discipline and work environment found within public health (Lasker, 1998). It appears that no two studies report the same profile of information needs for their participants. The level of detail in terms of how needed information is asked about and reported also varies. Some studies report needs for broad categories of information while others have chosen to focus on one category or type of information and report more detailed needs within that category. Information needs have been found to include access to experts (Centers for Disease and Prevention, 2000) and authoritative sources (Revere et al., 2007) as well as access to directories and listings of experts (O'Carroll et al., 1998). In some

cases there is actually a need for access to expertise in finding information – one study of needs with respect to literature search skills found that public health workers needed ongoing access to support from skilled literature searchers in order to help them develop their own searching skills (Dorsch, 1997). Data of various sorts is also needed. This is sometimes described generically as statistical or epidemiological data (Revere et al., 2007, Lasker, 1998, O'Carroll et al., 1998) and sometimes more specifically by type such as criminal justice data and disease incidence data or socioeconomic and industrial effluent data (Centers for Disease and Prevention, 2000). One study focused specifically on information needs in terms of epidemiological data, looking in detail at data needs for specific diseases. This found that, for example, participants were satisfied with the available data for Influenza, Pertussis and Meningitis but not for Chlamydia and Diabetes (Dixon et al., 2013). Key elements of surveillance data on these diseases were found to be diagnosis, age of patient, country of residence, zip code, city and healthcare provider (Dixon et al., 2013).

Other types of needed information include healthcare guidelines (Austvoll-Dahlgren and Helseth, 2012, Centers for Disease and Prevention, 2000, Turner et al., 2008, O'Carroll et al., 1998), legislative information (Lasker, 1998, Centers for Disease and Prevention, 2000), policy information (O'Carroll et al., 1998), health education information for the public and administrative/budget data (Centers for Disease and Prevention, 2000). Research is also reported as needed information (Revere et al., 2007, Silva et al., 2014, Forsetlund and Bjorndal, 2001). As with data, this is at times dealt with generally and at times specifically. For instance systematic reviews (Revere et al., 2007), clinical trials and epidemiological studies (Silva et al., 2014) are specific types of research that have been reported as needed. However, there is also reference to a need for research in more general terms (Revere et al., 2007, Forsetlund and Bjorndal, 2001). Information needs to be summarised and current to be useful (Revere et al., 2007, Turner et al., 2008), and there were comments in some studies on a need for access to the latest up to date information (Pham et al., 2010), although in some cases relevance was found to be more important than currency (Turner et

al., 2008) or timeliness (Le, 2013). Information needs have been found to differ quite widely, even within the same studies (Turner et al., 2008, Dixon et al., 2013).

Existing knowledge on information needs in public health therefore shows a great deal of variety. Due to the age of some of the studies mentioned above (approaching fifteen or twenty years old at the time of writing) and the diversity of findings it is tempting to conclude that it would be well worthwhile to continue with further research into public health information needs, as fresh and different findings in terms of what is needed seem to continue to come to light with each new study. There are however, one or two repetitions in the above studies, where the same or similar sounding types of information are reported as being needed in more than one instance of research. Research, statistical and epidemiological data and health guidelines seem to be the more consistently needed types of information.

Information needs research has also provided some limited information on attributes of information needed as well as types. A small number of studies reported findings on qualities that participants wanted information to possess, for instance authority, currency, being up to date and being relevant were mentioned. These attributes could be cross cutting, i.e. qualities that participants want information of any type to possess.

### 2.3.2 Information seeking and service use

A number of studies have been carried out that report data on the use of information channels and resources, i.e. where participants go to look for information (Lundeen et al., 1994, O'Carroll et al., 1998, Pham et al., 2012, Telleen and Martin, 2002, Turner et al., 2009, Turner et al., 2008, Wallis, 2006, Chambers et al., 1991). These studies have covered areas such as the search by public health professionals for information within academic journals, (Harris et al., 2014, Dorsch and Pifalo, 1997) online databases (Turner et al., 2009, Adily et al., 2004, Hollander and Martin, 1999, Twose et al., 2008, Harwell et al., 2008), library services (Le, 2013, Mortensen et al., 2013, Chambers et al., 1991), and information skills involved in using these sources and services to search (Le, 2013), use of or need for

different kinds of information (Lee et al., 2003) and identifying barriers to information (Hollander and Martin, 1999, Harwell et al., 2008, Le, 2013, LaPelle et al., 2006, Merrill et al., 2007, Rutland and Smith, 2010).

These studies have resulted in some understanding of information seeking and service use, and the problems that public health workers face when interacting with information channels and services. It has been found that public health workers turn to sources such as colleagues (Chambers et al., 1991, Revere et al., 2007, Austvoll-Dahlgren and Helseth, 2012, Turner et al., 2008, Lee et al., 2003), bibliographic databases (Wallis, 2006), their own personal collections of books and journals (Chambers et al., 1991, Austvoll-Dahlgren and Helseth, 2012), mass media and the pharmaceutical industry (Austvoll-Dahlgren and Helseth, 2012), the internet or web in general (Wallis, 2006, Turner et al., 2008, Lee et al., 2003, Le, 2013), mailing lists and list serves (Lee et al., 2003, Cilenti et al., 2012) and directory information (Lee et al., 2003). The purpose of use of this material is sometimes hinted at e.g. making decisions (Chambers et al., 1991, Austvoll-Dahlgren and Helseth, 2012, Dorsch, 1997). There is also some data on frequency of information seeking activities, e.g. over 80% in one survey reported looking for information at least once a month, and spending around one hour per week reading articles (Chambers et al., 1991), or 21% of participants reporting that they search online bibliographic databases on a weekly basis compared to 43% indicating that they had not used the databases at all in the last year (Adily et al., 2004) . Other studies back up the finding that bibliographic databases are searched infrequently (Turner et al., 2008, Lee et al., 2003), although more recent research seems to suggest an increase in their popularity (Le, 2013). The amount of time spent looking for information has also been studied, with indications that public health workers spend relatively little time looking for information e.g. just under half of respondents in one study spending less than 1 hour a day, and most respondents giving up their search if they do not find what they are looking for within 15-20 minutes (Le, 2013).



Similarly to the findings on information needs, looking at the literature on how public health workers go about looking for information, it emerges that a myriad of different sources are consulted. Although there are some repetitions in findings, once again, there are also differences. It may be that the variety of sources which public health workers turn to when searching is a side effect of the wide variety of types of information needed. Perhaps different sources house different types of information and this drives the behaviour of consulting a range of different sources.

Colleagues seem to outstrip all other channels of information by a long distance in terms of the frequency with which they appear mentioned in this literature. This could be reflective of the difficulty inherent in searching for information when there are seemingly so many places to look and so many different types of information. Perhaps it is easier to consult a colleague for a lead rather than going straight into a search. As well as details of the types of sources that public health workers consult, this literature has generated some knowledge on how public health workers go about doing this seeking. This knowledge is fairly limited however, being restricted to occasional findings on the frequency of searching and amount of time spent. If we assume an ability to generalise from these findings (which may not be the case given the diversity of the public health workforce) we know that the majority of public health workers spend at least some time each month looking for information, although if a specific search proves unfruitful early on, they are likely to abandon the enquiry. Information about the frequency of use of information channels and services seems patchy or inconsistent, specifically with regard to bibliographic databases. As already discussed above, colleagues seem to be the one perennial source of information.

### 2.3.3 Information barriers

Information overload has been found to be a problem for public health workers (Lasker, 1998, Revere et al., 2007, Austvoll-Dahlgren and Helseth, 2012, Le, 2013), as has the diversity of types of information needed in public health (Revere et al., 2007, Lasker, 1998). There have been complaints that public health information is not well organised, making it

difficult to know where to look (Lasker, 1998, Turner et al., 2008). Grey literature is noted as an important, but difficult to find type of information (Lasker, 1998, Revere et al., 2007, Lee et al., 2003). Technological difficulties seem to be a common complaint, i.e. lack of access to the internet (Lasker, 1998, Revere et al., 2007, Turner et al., 2008) or software (Wallis, 2006). It is quite likely however that some of these findings are a feature of the age of some of these studies, many of which date from the 1990s. Given the pace of technological change in the last 20-25 years it would not be unreasonable to assume that lack of internet access is probably not a serious issue anymore, at least in the developed countries with which this research is concerned. Other barriers experienced in interacting with information include lack of time (Austvoll-Dahlgren and Helseth, 2012, Lasker, 1998, Wallis, 2006, Le, 2013), lack of skills in searching (O'Carroll et al., 1998, Lasker, 1998), problems communicating information needs to library staff and problems in getting hold of the right information at the right time (Lasker, 1998), lack of access to full text (Le, 2013) difficulty in assessing quality of information/lack of critical appraisal skills (Lasker, 1998, Austvoll-Dahlgren and Helseth, 2012, O'Carroll et al., 1998), and lack of knowledge of what is available (Wallis, 2006, Le, 2013). Interestingly it appears that at least some of these barriers may have altered over recent years, as one more recent study found that the majority of participants were confident in their critical appraisal skills (Le, 2013).

Contrastingly, some barriers seem to be perennial and persistent, namely lack of time and information overload which continue to appear in research carried out over the period from the 1990s to the time at which this literature review was carried out in 2013/14.

Some research touches on psychological or personal factors as motivators or barriers to interactions with information. For instance a study of public health nurses found that the perception that looking for research information was not part of the nurses role was a barrier to use of research, whilst at the same time the idea that research provided a solid basis for practice and assisted with professional development were seen as facilitators to the use of research information (Austvoll-Dahlgren and Helseth, 2012). In another case it was

suggested that individual academic qualifications were associated with likelihood of using bibliographic databases (Adily et al., 2004).

Findings on the barriers to interactions with information seem on some level to intuitively fit with the findings on information needs and information seeking. Specifically, the findings on being time-poor and lacking in confidence in searching for information or knowledge on where to look may be linked to the limited data on how information is sought. For instance, it is easy to envisage, through pure speculation, a scenario where a busy public health worker sets out to look for a certain piece of information, knowing they have a window of time in which to find this information before they have to move on and do something else. They begin with an online search, but aren't sure which site is the most likely source, or how best to go about searching. They approach a couple of specific sites that they are aware of and perhaps do some general internet searching or try using a bibliographic database. However, after several attempts nothing useful has been found and the search is given up in frustration.

It can be seen from this overview of studies that the focus of information behaviour research in public health has, so far been directed at understanding what kind of information public health workers need and access, whether they have this information and how often they do actually consult it. This has been studied both in terms of types of information e.g. epidemiological data or research publications, and also in terms of the type of source which these workers use e.g. print and online, and databases, textbooks, journal articles or colleagues. Survey formats have been used for data collection in many of these studies.

It appears, from this overview that one thing that has not been looked at in great detail is the processes by which public health workers carry out these interactions with information. We know from the above summary something about what information is interacted with, how often it happens and what gets in the way of these interactions. However, this information does not describe the process of these interactions, particularly the process by which public

health workers make use of the information that they find. What happens during use of this information and data, what does use consist of?

In most cases, information behaviour studies carried out within the context of LIS research only hint at how information is used in public health, and do not investigate this aspect of behaviour in detail. Some information that might be useful to those who want to understand what happens when public health workers use information and what this use consists of can be found in a small number of studies, with qualitative studies being somewhat more informative. Findings relevant to understanding information use in public health are discussed in the next section.

#### 2.3.4 Information use in public health

Examples of studies which have included some questions related to end uses of information include a study of behaviour of infection control nurses (Mortensen et al., 2013), where respondents were asked about their use of journals for continuing education purposes, a study of the reading habits of infection control coordinators (Olmsted et al., 2006), which asked which journals were used to obtain infection control information, a survey of academics and local health department workers about their use of bibliographic databases for research (Scheiber et al., 1999), a study of the use of online databases where participants were asked about their use of databases to obtain population health information (Adily et al., 2004) and a study of public health academics (Wallis, 2006), which asked respondents to indicate whether they used certain resources for research, teaching or to obtain information about services. Data on use in these studies is collected by asking respondents to select options from pre-defined use categories (Wallis, 2006), or asking them to answer yes or no to questions on whether they use information for a specific purpose (Adily et al., 2004, Mortensen et al., 2013, Olmsted et al., 2006). The closed nature of these questions might mean that the insight into how information is used that can be gathered from these questions is limited. In fact, what the responses to these kinds of questions really tell us is that respondents carry out research, and search bibliographic databases in order to

find information for that research, that they use information during their research, or that they read a journal because it contains information on infection control. They don't tell us *how* the information found through databases is used in research or what function it serves for the participant.

Several qualitative studies found during this review are a little more useful as sources of knowledge on information use in public health. By their nature, these qualitative studies provide rich information on a relatively focused group of public health workers. In each case the group may be defined by a specific function that they perform. As such, the findings of these studies can not be assumed to be representative of all public health workers. This serves to highlight that additional further research on other groups of public health workers will continue to be worthwhile.

One study focused on public health inspectors (Pham et al., 2010), one looked at behaviour of pharmaceutical policy makers (Greyson et al., 2012). There are some findings from these studies which give a limited understanding of information use or potential information use. However, in each case the form which use takes appears to be quite closely tied to the specifics of the situations and roles which the participants perform. For example, participants in the study of public health inspectors describe seeing a lack of understanding of basic food hygiene standards and measures in food premises owners and food handlers during their visits, and as a result experience a need to explain regulations to these individuals (Pham et al., 2010). They also describe encountering specialty foods that they are not familiar with, and consequently express a need for more information about those foods such as their ingredients, treatment and shelf stability. Potential rather than actual uses of information are hinted at. The need for information on handling and storage of specialty foods suggests that if they had this information, participants might use this by sharing it with premises owners, or to improve their own knowledge by getting ideas on how different types of food should be stored. However, the potential use aspect of the health inspectors' information behaviour is not fully explored in the study, so the above suggestion has an element of speculation.

For the pharmaceutical policy makers, the kinds of situations that they encounter are quite different to those of the public health inspectors discussed above. For instance, the policymakers in this study reported a need to learn about broad policy answers, rather than being faced with many discrete enquiries (Greyson et al., 2012). Examples given included wanting to find out what other regions were doing in similar situations, or to find out about the content of other similar policies, or how to use policy to minimise drug abuse (Greyson et al., 2012). Clearly the very policy-oriented environment uncovered by this study would be quite different to the kind of scenario faced day to day by a public health inspector. The ways in which information is used also seem quite different, as far as this can be discerned from the reported findings. The data from this investigation is still largely focused on information seeking, for example, participants describe the channels that they refer to in order to obtain information, such as checking through a list of sources, delegating literature searching to other staff, and asking colleagues and trusted organisations for information (Greyson et al., 2012 p.21). However, there is some data which gives an insight into how respondents use information, as apparently “*some respondents admitted to seeking evidence that showed their policies in a good light, or supported cost-cutting*” (Greyson et al., 2012 p.21). This indicates the kind of use that might be classified as symbolic by adherents to the Weiss categorizations of research use – for a more detailed discussion on the meaning of symbolic information use see chapter three. This sort of use differs from the potential uses suggested by the study of Public Health Inspectors (Pham et al., 2010), in part because it lacks the feeling of immediacy which goes with the information needs of the Public Health Inspectors. That group may have wanted information on practicalities of what to do e.g. how to store or handle food at the point of contact with premises owners – so that they could pass this information on to them. For the policy makers the impact of the information they seek to use may be less direct as it would likely be used to formulate a policy for general application rather than to make a suggestion direct to an individual. However, there may also be a similarity between the two purposes. Both uses may have an element of justification to them. This comes across more clearly in the study of policy makers because they have admitted to

wanting information to back-up or justify their policies (Greyson et al., 2012). The Public Health Inspectors may equally want to show that the advice they are giving out on food handling is based on more than their personal expertise however – this could be why they express a need for information on foods that they are not familiar with (Pham et al., 2010).

Another study of public health policy makers (O'Carroll et al., 1998) shows both differences and similarities in its findings to that of the pharmaceutical policy makers (Greyson et al., 2012). Presumably, the participants of the two studies are similar in that they are both policy makers. Although there seemed to be some similarities in needs, as the participants in this second study also report wanting information on other policies around the country (O'Carroll et al., 1998), there are also differences. In this case, in contrast to the pharmaceutical policy makers, participants did experience a need for information to answer discrete research questions (rather than just broad policy related questions) (O'Carroll et al., 1998). However, the use data is limited to the use of information channels in order to try and find answers to these questions – for example it is reported in the findings that literature searches and appeals to colleagues for information were helpful in finding information to answer these questions (O'Carroll et al., 1998). What is missing, as with the other studies discussed above, is an exploration of what happens after the need for information is met.

Another qualitative study where the information needs expressed by participants might give clues to how they would use information looked at the information activities carried out by Health Visitors (Bacigalupo et al., 2005). The research describes participants as engaging in information processing activities, such as deciding if information is relevant, responding to it and disseminating it. Findings include a section on information needs and acquisition, and this section gives an idea of what the health visitors are using information for. For example, needs are described as *"running projects"* and *"how to do the job"* (Bacigalupo et al., 2005 p.87). These needs give clues to uses. The understanding that Health Visitors need information to help them do their job suggests that a particular kind of information use might occur, assuming that they get access to the kind of information needed. The

conceptualisation of this kind of information use is similar to a conceptualisation of use arising from organisational level information studies, where information use is seen as knowing in practice, or using the knowledge possessed on how to carry out an action or task, rather than knowing a fact about something (Savolainen, 2009, Orlikowski, 2002). However, the details of how information might help the Health Visitors to carry out their work are not explored in the study in question. For example, a piece of information might help an individual to work out how to do their job, but in what way? It could be something that suggests a series of practical steps that they need to carry out in order to perform a particular work task, or it could be something that helps them reach a decision on a course of action in a more general sense.

As well as some attempts to understand information use, there have also been studies that have looked at why information is not used. A study of public health physicians in Norway aimed to understand why they do not use research (Forsetlund and Bjorndal, 2002). This study focused on the non-use of a specific kind of information following on from an earlier study which had identified low use of research among public health doctors in Norway (Forsetlund and Bjorndal, 2001). This low use was attributed to a lack of questioning behaviour on the part of the doctors and was identified as an occurrence of an unrecognised information need (Forsetlund and Bjorndal, 2002). The interview guide used during this study focused on asking participants what questions had arisen for them at work. As the research was focused on non-use of research, the findings do not provide any information on how research is used. Although the interview technique applied might be used to help understand participant's information needs (by identifying the questions they have) it does not help to understand the full details of their situation, or the way in which they use information.



## 2.4 Conclusion

This chapter has presented the results of a literature review on information behaviour in public health. Overall, there appear to be relatively few studies of information behaviour in this group. In addition, the majority of studies found focus on information needs and information seeking. It therefore appears that information use stands alone as a sub-domain of information behaviour in public health workers that remains relatively unexplored. It may also be the case that because of the variety of roles and tasks which could fall within the discipline of public health even further study on the better researched areas of information needs and information seeking might continue to bring to light new knowledge and fresh understanding. This is indicated by the fact that there is relatively little repetition across findings in for example the kinds of information needed, or the sources that public health workers use to find information. The age of some of the existing research is also a reason to continue with fresh research in this area. Many of the studies are approaching twenty years old at the time of writing, and many things have changed with regard to how we interact with information in the workplace – not least the ubiquity of internet access, which could not be said to be the case when some of the earlier studies discussed here took place.

For health sciences including medicine and public health, changes have also been brought about by the Evidence Based Medicine (EBM) movement, which began in clinical medicine in the 1990s. There has also been a huge expansion in the production of systematic reviews, with one study reporting that in the period between 1991 and 2013, based on indexing in the PubMed database, there was a 2,728% increase in publication of systematic reviews compared to a 153% increase across all publication types indexed in PubMed (Ioannidis, 2016). The Cochrane Collaboration have led the way in the expansion of reviews (Djulbegovic and Guyatt, 2017), organising a collaboration stretching across 130 different countries (Cochrane Collaboration, 2020). Growing realisation of the importance of summarising evidence from primary research studies of varied design (including both observational and controlled trials) and the need to use EBM to improve the development of clinical guidelines by ensuring the

systematic reviews were recognised as a key indicator of quality in guidelines has prompted reorganisation of hierarchies of evidence which have been promoted by the EBM movement (Djulbegovic and Guyatt, 2017). Early on in the course of EBM, simple hierarchies were employed, which emphasised the importance of Randomised Controlled Trial study designs in decision making (Djulbegovic and Guyatt, 2017). These hierarchies have latterly been supplanted by more sophisticated grading systems which highlight that even Randomised Controlled Trials (which are often considered a gold standard of scientific research) can be prone to bias (Djulbegovic and Guyatt, 2017).

The EBM movement has also impacted on public health, influencing the development of the related field of Evidence Based Public Health (EBPH), which it has been said shares epidemiological roots with EBM (Kohatsu et al., 2004). The influence of EBM on public health extends to influencing the development of public health relevant systematic reviews, as the Cochrane Collaboration includes a Health Promotion and Public Health field which aims to produce relevant reviews (Kohatsu et al., 2004). The previous edition of the Cochrane Handbook included a specific chapter dedicated to methods for producing reviews in the area of public health and health promotion (Cochrane Collaboration, 2017). While a dedicated chapter relevant to public health no longer appears in the 2019 edition of the Handbook, its relevance to public health is still clear as the current edition includes consideration of elements that are highly relevant to public health such as the evaluation and study of complex interventions (Higgins et al., 2019). However, the transfer of the approach to using research information from EBM to public health has not been without problems. It has been argued that the complexity of public health interventions makes it difficult to apply the EBM model to public health (Orton et al., 2011).

Another point raised by this review is the lack of information behaviour theoretical background to most of the studies. Although a number of information behaviour models do exist and did exist when these studies took place, they are not often referred to. The study of pharmaceutical policy makers (Greyson et al., 2012) discussed above is one of the few to

make use of these theoretical frameworks. Interestingly, this study is also the only one, as far as can be seen, that makes an attempt to straddle the ground of LIS information behaviour research and research into the use of evidence and social science research (research utilization) in public health (Greyson et al., 2012). Research utilization is another domain of research relevant to this thesis and is discussed in more detail in the next chapter.

There is relatively little knowledge about information use in public health to be gathered as a result of this review. The final section of this chapter attempted to use qualitative studies of information behaviour from a number of different groups of public health workers (policy makers, public health inspectors, physicians and health visitors) to try to bring together some understanding of information use. However, at best it was only possible to derive hints, and often supposition based on what was suggested by the more concrete data on information needs found by these studies. In fairness, it does not seem to have been the primary purpose of these studies to understand information use, so this lack of data should not be seen as a criticism. The literature found and discussed in this chapter did however point towards another domain of research which might provide more insight into information use, albeit in a rather specific direction. As was mentioned earlier in the chapter, the search also retrieved a small number of articles on something known as 'research utilization', a separate domain with a theoretical background all of its own. This suggested that a more detailed investigation of this other domain was warranted through a further search. The results of this investigation are discussed in the next chapter.

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### 3 Research utilization in public health

Another outcome of the literature review of studies on information behaviour in the public health workforce was the realisation that there was a research domain existing entirely apart from information behaviour research which also dealt with use of information in public health – research utilization, sometimes also known as knowledge translation. Research utilization is concerned with the application of research or evidence in practice (Straus et al., 2009), and has been a popular topic in health sciences in recent years. Knowledge translation has been defined as “*a dynamic and iterative process that includes the synthesis, dissemination, exchange and ethically sound application of knowledge to improve the health of populations, provide more effective health services and products and strengthen the health care system*” (Canadian Institutes of Health Research, 2014). Various strategies and services have been launched to promote the use of knowledge in evidence informed decision making in public health (LaRocca et al., 2012).

Depending on the setting, what is meant by ‘application in practice’ can mean different things. For clinical medicine, practical applications of research can include use of research to show the effectiveness of a new drug, leading to changes in prescribing practices (Straus et al., 2009). For public health, application of research often includes its use in developing policy. The application of research and information more generally in development of public health policy was something that was particularly of interest in terms of information behaviour in public health. This interest arose because at the time of starting this thesis, the researcher was employed by a small third sector public health organisation or think tank, which included a small policy team. It is theorised that such organisations and their contacts play an important role in public health, according to the Advocacy Coalition Framework (Sabatier and Jenkins-Smith, 1993). This research was partly driven by an interest in understanding how individuals working within these types of organisations use information to help to support policy development. The development of research utilization literature in



public health has been driven by concern that policy makers are not realising the full potential of academic research (Newman et al., 2016).

The first literature search for research on information behaviour (see chapter 2) also retrieved a small number of articles on research utilization. The focus on measuring the application of systematic research or evidence suggested that this area would be relevant to information use. Accordingly, another literature search for articles on research utilization was carried out in May 2014.

The objectives of this literature review were as follows:

6. To find existing recent primary research on the knowledge translation or research utilization of the public health workforce carried out either in the UK, or in similarly economically developed countries
7. To use the research found to map research coverage against the various sectors of the public health workforce, highlighting which groups have yet to be studied
8. To synthesise the findings of the existing research to determine whether any consistent themes exist regarding knowledge translation or research utilization in public health
9. To examine the methodologies that have been used in existing research, with a view to highlighting suitable methods of study, and problems that have been encountered by other researchers.

### **3.1 Search strategy**

The following text or key word search was used to search the bibliographic databases Medline, Embase, Web of Knowledge, LISA, Scopus and PSYCInfo:

"knowledge translation" or "research utilization" or "research use" or "knowledge transfer" or "knowledge uptake" or "knowledge exchange" or "knowledge dissemination" or "knowledge

diffusion" or "evidence translation" or "evidence utilization" or "evidence transfer" or "evidence uptake" or "evidence diffusion" or "translation into practice" or "research translation"

AND

“public health”

Research utilization in public health is a difficult topic on which to search for literature. *“The absence of uniform terminology specific to this field of study [...] presents notable barriers to the start and completion of fruitful literature searches”* (Cunningham-Sabo et al., 2007 p.15). In particular there is a lack of common terminology with which to construct a search strategy for literature on utilization of research. Problems with the use of subject headings have also been found. For example, there is little in the way of subject headings in Medline database that accurately describe the field (Cunningham-Sabo et al., 2007), consequently prompting a greater reliance on text word terms than would usually be desirable for systematic searching. Those familiar with search strategy construction may notice that the search strategy is reliant on text words. The decision not to include any subject headings which might have been relevant was taken in order to avoid retrieval of a large number of articles not relevant to the topic at hand, which would then have to be sifted. As it was, the search retrieved almost 1,500 articles for duplicate removal and sifting.

Choosing not to use subject headings is a limitation to this search. The most important result of this decision is that the search may therefore have missed some relevant articles which would otherwise have been retrieved. The present review may not be an exhaustive overview of this topic, although it is hoped that it is representative. An attempt to catch any additional papers not found through the database search was made through citation searching. All search results were downloaded into EndNote reference management software. Duplicate references were removed using the built in EndNote duplicate removal

function. The remaining references were sifted for relevance according to pre-defined inclusion and exclusion criteria, which are set out below.

A total of 1,464 references were retrieved, with 771 remaining after the removal of duplicates. A breakdown of the number of results found from searching each database is provided in table 3-1 below.

**Table 3-1 Breakdown of results found during literature search on research utilization in public health**

<b>Date of search</b>	<b>Database</b>	<b>Notes</b>	<b>No. results</b>
14/05/2014	Medline (Ovid)	Limits: English language, 1984-current. Keyword search in abstract.	188
14/05/2014	Embase (Ovid)	Limits: English language, 1984-current. Keyword search in abstract.	204
14/05/2014	Web of Knowledge	Limits: English language, 1984-current. Keyword search in topic field (inc. title, abstract & author keywords).	556
14/05/2014	LISA	Limits: English language, 1984-current. Keyword search in abstract.	5
14/05/2014	Scopus	Limits: English language, 1984-current. Keyword search in title and abstract and keyword.	448
14/05/2014	PsycInfo	Limits: English language, 1984-current. Keyword search in abstract	63

Following the removal of duplicates, the remaining references were sifted against the inclusion and exclusion criteria listed below. References not meeting the inclusion criteria

were discarded at this stage. The objective of the search was to determine the extent to which the research utilization or knowledge translation (KT) activities in the public health workforce had been studied through primary research. Therefore, secondary research articles were not included. Articles that evaluated or presented knowledge translation initiatives aimed at the public health workforce were discarded unless they included findings on use of research. Where relevance to inclusion criteria was unclear from the article abstract, or an abstract was unavailable the full text of the reference was obtained in order to make a final decision on inclusion/exclusion in the review.

The diversity of the public health workforce, and the extent to which it overlaps with other sectors in health and social care made it necessary to employ criteria to differentiate articles of relevance to this research from those which, for example, focussed on information behaviour in clinical medical settings. Accordingly, one of the inclusion criteria applied when sifting the results of the search was that any article included had to use the term 'public health' to describe either the population of individuals studied by the research, or the setting in which they worked.

### **Inclusion criteria**

- Research on knowledge translation in public health which provides information about information behaviours in knowledge translation, e.g. preferences for specific methods of information seeking, specific types of publication or reference to behaviours relevant information literacy and management skills such as search or critical appraisal skills, or reference to information barriers experienced due to lack of these skills
- Secondary research on knowledge translation in public health including systematic and literature reviews and syntheses
- Reported on knowledge translation in a high income/developed country
- Research which had aimed to describe or understand the knowledge translation and/or evidence use of any sector of public health workforce

- Articles presenting conceptual frameworks or models of knowledge translation

### **Exclusion criteria**

- Research on knowledge translation in public health where the primary focus is on influence of external or organisation factors e.g. political, communication or financial and where there is no reference to individual behaviours relevant to information literacy or management skills
- Not related to knowledge translation in public health
- Research which had aimed to describe or understand the knowledge translation and/or evidence use of clinical staff without reference to their public health function
- Evaluates or trials a knowledge translation strategy/intervention without providing any data on knowledge translation behaviours of users
- Reported on knowledge translation in a low income/developing country
- Editorials, opinion pieces or commentaries on knowledge translation and evidence based public health

Following completion of sifting by title and abstract, 27 references remained, including 22 primary research studies (including one degree thesis), 2 systematic reviews and 2 conceptual papers. References of the systematic reviews were scanned, and this identified an additional 21 relevant pieces of research matching the inclusion criteria listed above, bringing the total number of relevant references identified to 47.

### **3.2 How 'use' is conceptualised**

In contrast with the literature on information behaviour in public health, research utilization literature seems to make much more use of a theoretical background, spending more care on defining what is meant by research use. As this theoretical background is sometimes also carried through into how findings are reported it is worthwhile to discuss it briefly here, although a more detailed discussion of conceptualisation of information use can be found in chapter 4.

There are complexities to understanding what is meant by use in knowledge translation and research utilization, and it is helpful to briefly consider the available theories about the interaction between different communities in order to develop and understanding of the context within which use is seen. A review of theories related to the interactions between actors in research policy and practice identified seven theoretical models which can explain how these interactions take place across different contexts (Leeuw et al., 2008). These theories suggest that the nexus between research, policy and practice is a dynamic entity with blurred boundaries between groups, individual actors can endeavour to influence policy by altering network composition, and individuals or organisations may act as conduits translating research into more user friendly language to facilitate use, and the impact of evidence can be muted if it goes against political agendas (Leeuw et al., 2008).

Within the dynamic setting of translation and utilization described above, conceptualisations of information use in literature on research utilization and knowledge translation in public health vary, with some being better developed than others. The focus in the present chapter is on literature which has explored how the end products of research i.e. research reports have been used rather than on the sociological processes of the construction of science and fact (i.e. as proposed by Latour and Woolgar (2013)). One conceptual framework or categorisation of research use that has often been employed to study use is a tri-partite categorisation of use as symbolic, conceptual and instrumental. Instrumental use is seen as happening where there is a very direct, demonstrable connection between what a piece of research or information says, and an action or decision that is taken (Amara et al., 2004). It is sometimes equated with “*documented use*” (Zardo, 2015 p.4). In literal terms, this type of use seems to be understood as, ‘this piece of research said that ‘intervention A’ will work, so we implemented ‘intervention A’’. Conceptual use is described as the use of research to support general understanding of something, and symbolic use is described as the use of research to provide a rationale for a decision or action that has already been taken, or a belief that is already held (Amara et al., 2004). Occasionally, alternative labels are used for

what appear to be variants on these conceptualisations of research use with the same, or very similar meanings. For instance a survey of state legislators suggested an alternative five categories of use – policy making influence, enlightenment, access to information, rationalisation and tactical use (Hird, 2005). An interview study with civil servants and parliamentary ministers and advisors included the conceptual and instrumental uses seen in the usual tri-partite categorisation, with the addition of further categories of rhetorical and opportunistic (Haynes et al., 2011). The words used to describe the forms of research use discussed in these two studies indicate an overlap with the more commonly used labels of conceptual, instrumental and symbolic.

Conceptual use is sometimes also described as use for enlightenment (Amara et al., 2004, de Goede et al., 2012b, Lavis et al., 2002, Zardo, 2015), and symbolic use is sometimes described as tactical use (de Goede et al., 2012b, Lavis et al., 2002) or political use (de Goede et al., 2012a). Symbolic and conceptual use have been seen as undocumented use, in contrast to the documented instrumental use (Zardo, 2015). Persuasive use is also sometimes mentioned, and described as use to “*justify the existence and/or current policy of an organization*” (Anderson et al., 1999 p.1010): this appears to be the same as symbolic use. Rhetorical use is also described as strategic or tactical (Haynes et al., 2011). A further variation on this system of categorisation comes from a Canadian ethnographic study of local public health unit staff (Lemay and Sa, 2014). This approach adapted a continuum of research use from a previous study (Nutley et al., 2007), arguing that this is more appropriate than discrete categories, because it better reflects the dynamic nature of research use. Nonetheless, the continuum developed does show some overlap with the categories discussed above. It spans concrete and conceptual and substantive, elaborative and strategic uses of research. Concrete use refers to use where behaviour and actions are influenced, while conceptual refers to use where ideas are formed and attitudes, awareness and understanding are changed (Lemay and Sa, 2014)– overlapping with the usual conceptual definition. Examples of concrete use include where research directly influences a

decision (substantive-concrete), where research further defines or refines a position or decision (elaborative-concrete) and where research is used to justify a position already adopted (strategic-concrete) (Lemay and Sa, 2014) – overlapping with the instrumental and symbolic uses usually described. Examples of conceptual use include use where research indirectly informs orientation to an issue or its basic understanding (substantive-conceptual), where research is used to further refine that understanding (elaborative-conceptual) and where research is used to confirm or strengthen an understanding already in place (strategic-conceptual) (Lemay and Sa, 2014) – also overlapping with the usual conceptual use description. The terms conceptual, instrumental and symbolic do not always seem to be clear cut in their definitions. There is variation in the terminology used to talk about use, with some terms being more suggestive of specific uses, e.g. political or rhetorical seems suggestive of a certain type of particularly persuasive use.

Another way of thinking about use which often seems to feature in research utilization literature is as decision making or problem solving. The problem solving model involves the identification of a problem for which *“the solution [is] sought through existing research, research in progress or new research and then information transferred from the research arena to the policy and practice arena.”* (Elliott and Popay, 2000 p.462). An interactive model is also sometimes mentioned, where *“research is one of several knowledge sources on which policy makers draw in an iterative process of decision making”* (Elliott and Popay, 2000 p.462). In both instances there seems to be a link between decision making, as papers discussing these models (Elliott and Popay, 2000) make frequent reference to decision makers or decision making at the same time. Some research utilization studies do not seem to provide detailed discussions of their conceptualisation of use before explaining their methods and findings. However in a number of cases (Green, 2000, Dobbins et al., 2001, von Lengerke et al., 2004, Armstrong et al., 2006, Dobrow et al., 2006, Galani and Rutten, 2008, Campbell et al., 2009, Bennett and Holloway, 2010, Hinchcliff et al., 2010, Jack et al., 2011, Orton et al., 2011, Suter and Armitage, 2011, Wathen et al., 2013, Armstrong et al.,



2014) reference is made to informing decisions, decision making or decision makers, actions taken, or the influence of research or other evidence on decision making, often embedded within a discussion of the tenets of the evidence based healthcare movement and evidence based practice. Studies looking at the use of research or evidence in the development of recommendations (Macintyre et al., 2001, Dobbins et al., 2004, Dobrow et al., 2006, Innvaer, 2009), or for the purpose of determining revisions to policies (Frey and Widmer, 2011) are interpreted as working from a decision making conceptualisation of use because the use of evidence as a basis for recommendations can be seen to imply use to decide what recommendations should be made and/or what their content should be. The tri-partite categorisation system of use (symbolic, conceptual and instrumental) and its variants are mentioned semi-regularly in the literature on research utilization in public health. This and the more generic 'decision making' conceptualisation discussed above seem to dominate the understanding of 'use' in this field.

In some cases, studies make reference to the tri-partite categorisation as a conceptualisation of use in their background or introductory sections, but these categories are not always carried through the research to be used as frameworks to present findings. In some cases, research utilization studies, even though referencing these types of use, expend more effort on exploring and discussing the involvement of public health practitioners and policy makers in the research process, gathering their views on research and what constitutes evidence, and their relationship with public health academics. These instances of research often do not provide much detail about actual use of research by those that they have interviewed. Examples of this kind of research, where the focus is less on use and more on involvement in the research process include Anderson et al. (1999). Some studies, for example Katikireddi et al. (2014), have used policy development theory as a framework against which to analyse the development of policies such as the Minimum Unit Pricing (MUP) policy, rather than using information use conceptualisations. In other examples, the focus is on the kinds of research used, rather than how it is used. For example an interview

study of evidence use by drug policy makers (Ritter, 2009) cited Weiss' categorisation of types of use as including use for problem solving, strategic or political purposes and for general advancement of knowledge. Sources of evidence included experts, technical reports, the internet, statistical data, other policy makers, academic literature, internal expertise, government policy documents and consultants (Ritter, 2009), which is interesting but does not describe *how* the information was used.

In other cases, use of these categorisations to report findings related to use is partial in that some of the same or very similar categories are used, but they also appear to be mixed with other categories for use developed during that study. For instance a PhD thesis on research utilization in US policy reported finding strategic utilization (which can be interpreted as meaning symbolic utilization – see discussion above), but also agenda-setting utilization (Kromm, 2011). Agenda setting utilization could well be an interesting finding in its own right, but the use of this additional categorisation rather than the original tri-partite scheme often used elsewhere could illustrate that the tri-partite scheme is not sufficient to represent the full range of types of use that may be found. This shows the difficulty in synthesising knowledge on use of information in public health, as there appears to be a lot of variety in ways of measuring and describing use. There also seem to be strong links between the ideas of use, and decision making. Although not always explicitly stated, the idea that information can tell an individual what decision to make in a given situation seems to underlie a number of these research utilization studies.

Some studies of research utilization in public health do not set out a specific conceptualisation of use which they intend to measure. In these cases, it could be considered that the definition of use is therefore left open. However, it also means that it can be difficult when reading these articles to understand exactly what they attempted to find out and what was intended to be covered by their research. These studies report a variety of uses of information. Uses include general decision making, evaluation of interventions,

developing recommendations, informing campaigns, enhancing credibility, influencing policy and advocacy (Bickford and Kothari, 2008), prioritisation in public health planning (Kothari et al., 2012, Larsen et al., 2012), planning (Bickford and Kothari, 2008, Kothari et al., 2012, Larsen et al., 2012), implementation of interventions (Larsen et al., 2012) inspiration and ideas (Kothari et al., 2012). Types of information participants referred to using included advice from colleagues (Bellew et al., 2010, Kothari et al., 2012), websites, experts, (Bellew et al., 2010), journals and research (Bellew et al., 2010, Kothari et al., 2011), past experience and epidemiological data (Kothari et al., 2012), magazines, surveys and interviews and legislation and regulations (Kothari et al., 2011).

### **3.3 Findings of research utilization literature**

So far this chapter has established that public health research utilization literature conceptualises use in a variety of different ways. There seem to be two dominant ideas of what use is in this area – the tripartite scheme of symbolic, instrumental and conceptual (and its variants) and the idea of use as decision making. In some instances, conceptualisations of use seem to be lacking and in other cases they are referenced but not carried through to reporting of findings of research. This chapter will now turn to considering what the findings of this domain of research are, and what this can tell the reader about information use in public health. This will begin by looking at the literature presenting findings on instrumental, symbolic and conceptual use, and will then move on to looking at findings regarding use as decision making.

#### **3.3.1 Symbolic, instrumental and conceptual use**

Examples of what has been interpreted as instrumental use include use of data indicating high prevalence of heart disease in one area to prompt public health planners to take some action that would presumably lower prevalence (although the exact action was not specified) (Hivon et al., 2005), and the use of health memorandum documents to mediate discussion where apparently these documents “*led to negotiated opinions within the [organisation of study] and better collaboration...and improved inside the RPHS instrumental use*” (de Goede

et al., 2012a p.712). Instrumental use has been described as use of scientific knowledge to “[...] respond to well defined objectives. Given an identified problem, knowledge provides the means of choosing the best solution” (Hamelin and Moguen-Toursel, 2012 p.210).

Instrumental use has also been seen as use through citation and reference of research in policy documents for purposes such as the prioritisation or development of public health interventions (Lavis et al., 2002).

These descriptions of instances of instrumental use can be a little difficult for a reader to understand. Instrumental use, as discussed in section 3.2, is taken to mean making a decision or taking an action as a direct result of a piece of information – because that piece of information indicated that it would be the best or right thing to do. Whether or not the use of information to drive the negotiation of opinions within an organisation (as quoted in one of the examples above) would constitute instrumental use may not be universally accepted. It could be argued that using information to drive negotiation of opinions might also be seen as tactical or political use (sometimes known as symbolic use). However, the limited detail available in these examples makes it difficult for a reader to judge – as a number of things could be understood to be entailed in negotiation of opinions between groups of people.

Gathering together these examples of instrumental use from primary research also shows the variation in how this is interpreted. Use of information as a supporting written reference as seen in one study seems to be use on a different level to use in negotiation. The shadow of the idea of decision making is also seen, with reference to choosing a solution in one of the examples. What is more important – how the information is used, i.e. as a physical citation, or the purpose of the use, i.e. decision making?

Examples of conceptual use include the use of research to stimulate debate and discussion on issues and policies: *“For example, a report on the human genome pointed out contextual issues the government should act upon in the relatively short term, broader issues that should be discussed in the public arena and emerging issues that would need to be managed in the future.”* (Hivon et al., 2005 p.271). This example suggests the use of

information in shaping priorities, although conceptual use is traditionally seen as being for purposes of enhancing or developing understanding. Interestingly, one of the examples of instrumental use, given previously, also mentioned use for priority setting. This could indicate an overlap between conceptual and instrumental use. The key to understanding the application of the conceptual category in this case may be the use of the phrase “*pointed out contextual issues*” (Hivon et al., 2005 p. 271). Perhaps this use has been understood as conceptual because it has prompted realisation of new knowledge of issues.

Examples of what has been interpreted as symbolic use include the following: “[...] *one Health District had mandated the provincial agency to assess a controversial surgical procedure. The report turned out to be very useful in distinguishing between solid evidence and evidence that needs to be qualified. Consequently, it reinforced the Ministry and the Health District in their recent decision to invest additional funding supporting this practice*” (Hivon et al., 2005 p.271). Strategic or tactical use (which appears to be similar to symbolic use, see section 3.2) has also been described as “*the use of research to advance pre-determined advocacy priorities*” (Kromm, 2011 p.77). Real life examples presented as findings in the literature include: “*I probably use the facts that bolster my argument. I will share information if somebody requests it, but I'm not going to present a study that says excise tax doesn't decrease consumption. I'm not going to volunteer [that type of information].*” (Kromm, 2011 p.80), or the example of a government delaying implementation of a policy measure by extending scientific evaluation studies of this measure (Hamelin and Moguen-Toursel, 2012).

One thing which seems to emerge strongly in the examples of symbolic or tactical use is the purpose of justification. These examples use the words reinforcement and bolster, and this seems to show a clear desire to use information to show that arguments are based on more than personal opinion or knowledge.

Previous research also provides examples of apparent blending of these types of use. For instance, one study claimed to have detected a combined instrumental and conceptual use

relating to the use of best practice information on tobacco regulation. The following description of this use was given: *“After identifying these best practices, however, our practitioners’ knowledge was then filtered through and shaped by their experiences, and own personal and professional values, situated knowledge, and contexts of practice (including community members’ needs and input) exemplified in the latter model. As a result, the use of research by HA staff can be classified as both instrumental and conceptual. Tobacco reduction is an example of HAs instrumental use of research where evidence directly influences policy and practice”* (Higgins et al., 2011 p.289). It is a little difficult to un-pick from this description, which aspect of this real-life example was considered to be instrumental and which conceptual. However, based on the general understanding of the terms instrumental and conceptual as described in public health research utilization literature, it could be assumed that participants had lifted examples of tobacco regulation initiatives from best practice literature and, based on reports of the success of these examples chosen to replicate that practice (instrumental use). The reference to participants then filtering the knowledge they had gained through their own experiences may be intended to suggest that sometimes participants were not using research to directly suggest implementing a certain intervention, but rather used the knowledge from that research to inform their thinking more generally and perhaps to suggest a similar but modified version of that practice. This study did not report specific findings with regard to symbolic use of research.

Blended symbolic and conceptual use has also been described, for instance in a study of use of local health memorandum documents (LHMs): *“[...] LHMs were mainly used as a starting point for policy deliberations and facilitated discussion with policy actors on problem definitions and solutions. Conceptual use, for a better understanding of the health situation, and incidentally symbolic use, support of prior policies, were mentioned. One of the respondents described the LHMs as follows: “It gives a concise overview about the main health problems and risks of a part of the residents, so that priorities can easily be established. However the disadvantage is that it excludes risk groups such as young care*

*givers, who grow up in a family with chronic illness and people with addictions or disabilities”.*” (de Goede et al., 2012a p.711). As with the previous example of blended instrumental and conceptual use, it is a little difficult to pick out what activities constitute use in this example. An occurrence of conceptual use seems reasonably clear, where participants have described the research as giving them an overview. However, symbolic use, use to legitimate a pre-determined position, is less immediately obvious.

There are indications that the same pieces of research can be used in a number of the different ways over a period of time. The study mentioned in section 3.2, which used a variation of the 3 part categorisation of use, using a continuum to define research use found that use of the same piece of research moved along the continuum (Lemay and Sa, 2014). It also found that elaborative and strategic uses of research were more common than substantive uses (Lemay and Sa, 2014). Participants in this study mentioned using research for professional development and to support research funding proposals. With regard to use for funding, use appears to have mainly included discussion of research in literature reviews written as background for funding proposals. The researchers noted that the kinds of use which they observed during this study often stretched across several of the types of use described in their continuum (Lemay and Sa, 2014). For example, in the case of reports made to members of the local Board of Health, different reports were used in different ways. Some were used ‘for information’ only, which was identified as a kind of conceptual use, while others actually came to be a factor behind decisions to take action over local regulations, which was identified as concrete-elaborative-strategic use (Lemay and Sa, 2014).

There are also instances of research utilization studies using qualitative approaches or mixed methods approaches to measuring use. For instance document analyses studies consisting of analysing a sample of policies to look for citations of research have been carried out a number of times, and in some cases are mixed with other methods such as interviews (Frey and Widmer, 2011, Zardo and Collie, 2014). These studies still use the

categories discussed above, but the nature of their methods mean that they are not able to give as much insight into what actions make up the use which they have tried to study. In some of these cases, the researchers are able to report that instrumental use has been detected, saying for example that “*research was always used in instrumental ways*” (Lavis et al., 2002 p. 138). However little information is available to the reader to judge whether this is the correct interpretation of use or to find out more about what use consists of.

In some cases, these categorisations of use were measured via survey questions (de Goede et al., 2012b, Zardo, 2015, Amara et al., 2004). Survey questions on instrumental use asked, for example, whether information had led to new policy actions or to the termination of existing policies (de Goede et al., 2012b), had been acted on in specific and direct ways, referred to in the survey as documented use (Zardo, 2015), or had led to definite, decisive and concrete actions (Amara et al., 2004). Questions on conceptual use asked whether a better understanding of the occurrence and causes of health problems or new long-term ideas for projects or policies had arisen due to the information (de Goede et al., 2012b), or “*[...] had been used to inform, generally or indirectly, understanding of an issue (not documented, not for a specific purpose)*” (Zardo, 2015 p.4), or “*[...] had a very important or decisive impact that served to shed light on situations and problems in their field of work*” (Amara et al., 2004 p.90)

Questions on symbolic use asked whether information had led to questioning of existing policies and decisions or had allowed participant to put personal ideas on the policy agenda (de Goede et al., 2012b), or “*[...] had been used to support or argue for certain positions or plans of action (not documented, but for a specific purpose)*” (Zardo, 2015 p.4) or “*[...] had a very important or decisive impact that served to confirm choices already made in their field of work (symbolic use)*” (Amara et al., 2004 p.90).

In these instances, it is difficult to discern much about what these uses of information consisted of. A definition of each type of use had in effect been provided in the individual survey questions asked, and respondents were therefore making interpretations of specific



instances of use of research that they remembered, and which they thought fell into those categories. However, the nature of surveys as a data collection tool means that there is no room for respondents to provide a more detailed explanation of what they have done with information. They are simply required to answer a tick box question, and therefore provide data on whether use falls into that category at a general level, leaving out what may be more nuanced specifics.

These studies provide some evidence for conceptual use being one of the more common uses of research in public health. Two of the three studies using surveys to detect this use reported conceptual use as being more common than instrumental and symbolic use (Amara et al., 2004, de Goede et al., 2012b). However, these two studies both looked at different types of information. One asked participants about their use of university research in general (Amara et al., 2004), while the other asked about use of local health memorandum documents specific to a certain geographic locality (de Goede et al., 2012b). Therefore, attempting to compare findings of these studies to derive a general picture of research use in public health may be to attempt to compare apples and oranges. A third study illustrates this point, by producing findings that show that different types of information may be put to a certain type of use more frequently than others. This study found that instrumental use was the most common type of use of internal data and reports, policy and legislative info, medical/clinical evidence, experience and expertise, while academic research and online information were more frequently used for conceptual purposes (Zardo, 2015). This indicates that the frequency of a certain type of use for a certain type of information should not be taken to apply to other types of information relevant to public health.

Other instances of survey research on research utilization in public health have not directly operationalised the conceptual, symbolic and instrumental uses in to survey questions, making it difficult to extrapolate to these uses from the survey data presented, e.g. Newman et al. (2016) and Lomas and Brown (2009). Survey findings included that there was “[...] no

*special inclination toward using research for policy making purposes [...] In fact, only 28 percent of respondents indicated that they always or usually adapt academic research for informing policy.*" (Newman et al., 2016 p. 28). The results presented in the above quote could refer to instrumental and/or conceptual uses – it is difficult to discern much about actual use from these responses.

Lomas and Brown (2009) used semi-structured interviews to detect 3 uses of research: helping to set or anticipate agendas, informing new policy development and modifying existing policies. In each case it appears that different types of information, and in some cases sources of information were helpful for each purpose, for instance career scientists helped to set agendas, literature reviews helped to inform new policy development and data and data analytics branches helped to modify existing policies (Lomas and Brown, 2009). *"Evidence in regard to setting agendas, particularly for peer-reviewed research, seems to function in two ways. First, it can signal what emerging or neglected areas may need to be on the agenda, although civil servants and their political masters still resist all but the most compelling of these areas, given the usually crowded nature of policy agendas. Second and more important, research can validate (or otherwise) the issues claimed by interest groups to be worthy of inclusion on the policy agenda"* (Lomas and Brown, 2009 p.917). This example does seem to echo previous examples of use from qualitative studies discussed earlier in the chapter, particularly in its reference to priority setting. This could be interpreted as conceptual or instrumental use. There are also some references to something that sounds like symbolic or instrumental use: *"In regard to developing new policies, our interviewees reported that evidence improved their confidence in making recommendations and in "speak(ing) truth to power" [...] prevented them from repetition and duplication, and, in the case of peer-reviewed research, gave politicians an extra-bureaucratic source of validation for a course of action recommended by civil servants: an imprimatur from the outside world."* (Lomas and Brown, 2009 p.918).

### 3.3.2 Decision making

Another theme within research utilization literature is the use of research to support decision making. Numerous studies have been carried out to assess the use of research in policy making activities and use in policy making seems to largely have been equated with decision making. Studies have investigated the use of information for recommendations, and decisions about content and implementation of policies.

Some of these studies give indications of the extent of use of certain types of information in decision making. For instance, cost-effectiveness analyses have been found to support decisions about medical technologies more often than cost-minimisation or cost-benefit analyses (Galani and Rutten, 2008). Randomised controlled trials have been found to have some impact in some studies (Wathen et al., 2013), whilst in others, use of this particular type of research seems to be low (Bédard and Ouimet, 2012). Systematic reviews (Dobbins et al., 2004, Campbell et al., 2009) and unspecified academic research (Waddell et al., 2005) have been shown to have some impact, and at the very least to be useful or used in the development of health recommendations and policies. In the UK NICE guidelines are apparently seen as vital to making decisions about commissioning of health services (Wye et al., 2015).

Studies of the use of information in policy making also indicate that a variety of types of information can affect decision making. Although these studies may begin with the aim of either proving or disproving use of research in public health policy, they are useful in highlighting the range of types of information that apparently have an influence. For instance, information on constituents' or community attitudes toward policy or interventions have been found to be useful or used by decision makers (Hinchcliff et al., 2010, Elliott and Popay, 2000, Green, 2000), and performance evaluations of interventions (Wye et al., 2015, Armstrong et al., 2006, Bennett and Holloway, 2010, Jack et al., 2011) have also been found to be used. Systematic reviews (Dobbins et al., 2001), other summaries and reviews of research (Bennett and Holloway, 2010, Campbell et al., 2009) and 'local data' or local

population data have also been found to be used (Campbell et al., 2009, Armstrong et al., 2014). Knowledge, experiences, expertise and opinions of other people and colleagues also recur as a sources of 'evidence' or information used in making decisions about public health policies and interventions (Green, 2000, Waddell et al., 2005, Armstrong et al., 2006, Jack et al., 2011, Young et al., 2014). Qualitative research and best practice guidelines or perceived best practices are used in some cases (Jack et al., 2011). There have also been attempts to study the quality of scientific information used, and the degree of clarity with which policy writers explain how they have weighed up evidence to reach conclusions when developing recommendations and policies (Innvaer, 2009).

Paradoxically, there are also studies which have discovered cases where policies have been developed that have contradicted existing research evidence (Frey and Widmer, 2011), where policies have been developed or suggested in spite of the absence of supporting evidence (Bennett and Holloway, 2010, Gordon and Anderson, 2011, Macintyre et al., 2001), where policies for which is there is considered to be substantial evidence have **not** been implemented (Gordon and Anderson, 2011), where policies are developed based on pre-existing ideas of agendas, with supporting evidence sought at a later date (Orton et al., 2011, Jack et al., 2011) or where policies have been developed without explicit reference to evidence even though it does support the relevant policy (Frey and Widmer, 2011). There are also cases where research analysed for the purpose of developing policies and recommendations has apparently been misconstrued, mis-used or interpreted in apparently contradictory ways at different times within the same policies (Wathen et al., 2013).

Attempts to quantify use of research, e.g. through surveys and questionnaires asking about research use (von Lengerke et al., 2004, Dobbins et al., 2004, Dobbins et al., 2001, Galani and Rutten, 2008) or document and citation analysis studies (Frey and Widmer, 2011, Zardo and Collie, 2014) have also been made. In some instances these research studies have focused on specific types of research and how they are used, e.g. systematic reviews (Dobbins et al., 2004, Dobbins et al., 2001), economic evaluations (Galani and Rutten, 2008)

and in other cases they have looked at research in a more general sense (von Lengerke et al., 2004). Use of research appears to vary across public health policy areas and across types of information. For example one study comparing research use in policies in breast cancer detection, smoking prevention, physical activity promotion and healthy working and living conditions found that breast cancer detection and smoking prevention generally had medium to high levels of research use while physical activity promotion and healthy environments had low levels of use (von Lengerke et al., 2004). Studies focusing on specific types of research and their use found high percentages of use in some cases, e.g. 96% of respondents in a study on use of systematic reviews reported use of this type of information in guideline development, and 47% reported that they had led to recommendations for practice (Dobbins et al., 2004). In another instance, 63% of participants reported using a systematic review to help make a decision in the previous 2 years (Dobbins et al., 2001). A synthesis of primary research on use of economic evaluations found that most studies reported moderate use of this type of information (Galani and Rutten, 2008). In some instances qualitative and mixed methods studies also attempt to assess the degree of use of research as high, medium or low. For instance, a Swiss interview study of use of evidence in policy revision looked at the existing available evidence for specific policies and then compared the content of that evidence with the content of the revisions to the policies (Frey and Widmer, 2011). The influence or use of evidence was then categorised as 'high', 'moderate', 'low' or 'no influence' (Frey and Widmer, 2011). Only two instances of high influence of evidence were detected, compared to seven instances of low and no influence (Frey and Widmer, 2011).

There have also been attempts to quantify the frequency with which different types of research are used, by counting their appearance in specific policy documents (Zardo and Collie, 2014). In one such study, each piece of evidence cited was categorised as having been used to support policy development or support decision making in injury claim cases (Zardo and Collie, 2014). The category 'supporting policy development' meant the purpose

for reference to information was to validate the need for the policy (Zardo and Collie, 2014). In contrast, the code 'supporting claims decision-making' meant the purpose for reference to information was to support compensation payment decisions made by TAC claim managers (Zardo and Collie, 2014). Support for decision making was found to be the most common purpose of use by this method (Zardo and Collie, 2014). Use of research to back-up or support decisions is also described as confirmatory use, found in some studies. For instance a study on the use of research on breast cancer prevention detected this confirmatory use, e.g. use to confirm that a pre-existing course of action was correct and to back-up field or experiential knowledge (Kothari et al., 2005).

These studies present findings on the extent and type of research use in different circumstances. Policy topic areas dealt with by these studies vary widely, from transport injury compensation claims (Zardo and Collie, 2014) to breast cancer screening and smoking prevention (von Lengerke et al., 2004) to name but a few. To understand how information is used in public health, it would also be helpful to have more detailed information on the contribution that different pieces of research made to decisions in policies and interventions. What shape do these contributions take? Other than a categorical knowledge of whether or not a piece of research has been used to make a decision, is it possible to have a more nuanced understanding of *how* that research was used, what purpose it served for individuals?

Some further information towards answering these questions can be gleaned from these decision making focused studies. However, details are scarce and fragmentary, and piecing together a coherent understanding of public health information use based on these studies is a little like trying to piece together a jigsaw puzzle. Nevertheless, some commonalities can be interpreted from the literature. Use of research in choosing or prioritising policies or initiatives has been found several times (Armstrong et al., 2006, Green, 2000, Hinchcliff et al., 2010, Wye et al., 2015, Orton et al., 2011, Jack et al., 2011, Kromm, 2011, Armstrong et al., 2014, Katikireddi et al., 2014), as has use in contributing to understanding, debate or

clarification of policy problems (Elliott and Popay, 2000, Orton et al., 2011, Suter and Armitage, 2011, Jack et al., 2011, Haynes et al., 2011), and also for re-framing of an issue (Katikireddi et al., 2014). In one case, use of researchers as individuals, as well as their research was described as being for the purposes of galvanization, or inspiration, and also for stimulating of long term strategic thinking on policy (Haynes et al., 2011). In another instance, use of research for prioritisation or agenda setting was further differentiated into foundational and influential uses (Kromm, 2011). Foundational use consisted of using research to form the basis of the policy agenda, by choosing which policy measures should be considered or pursued (Kromm, 2011). Influential use appeared to consist of then choosing which of the agreed measures should be given priority (Kromm, 2011). Policy related research use has also been described as consisting of use “*to validate the need for the policy*” (Zardo and Collie, 2014 p.3), or to highlight public health problems for policy attention (Katikireddi et al., 2014), both of which could be seen as akin to the prioritisation of policies, if a specific piece of research is used to validate or support addressing one policy over another.

‘Advocacy’ or to advocate for or against or justify different policies or interventions (Armstrong et al., 2006, Waddell et al., 2005, Frey and Widmer, 2011, Wathen et al., 2013, Suter and Armitage, 2011, Haynes et al., 2011) is also mentioned as another use of research. The idea of research or researchers as a sort of defence, behind which policy makers can hide is also mentioned (Haynes et al., 2011). Research can also be used to suggest priorities for further research (Wathen et al., 2013). This could be similar to prioritisation and selection of policy agendas. Some quantitative studies indicate that this type of use is infrequent however, with use to inform policy content and direction being more frequent (Campbell et al., 2009). Determining policy ‘content’ is another use which is apparently found in some cases (Campbell et al., 2009, Armstrong et al., 2006, Wathen et al., 2013, Haynes et al., 2011), though in other situations the use of research to inform the specifics of policy is apparently limited (Armstrong et al., 2007). There is also reference to

the use of research to inform strategy which is seen as different in use for priority setting with strategy setting out more specific action (Armstrong et al., 2014). It is not always clear what is understood by 'policy content', or 'strategy', but both terms are interpreted here as including details of intervention specifics. For instance a study of research use in intimate partner violence (IPV) screening policies found use of research as a reference for measures of IPV screening outcomes (Wathen et al., 2013), and this is understood here to be policy content, as presumably the way in which success of screening is to be measured would form part of the specifics of a screening plan or policy in this area. In another case researchers were described as helping to form interventions and their content, e.g. *"[...] what every part of your intervention needs to look like. How many times a week they need to come, how long they need to perform, all those sorts of things. So really practical advice on the design of the intervention."* (Haynes et al., 2011 p.574)

Finding out which policies have already been, or are likely to be successful in achieving the desired aims is cited as another example of use (Hinchcliff et al., 2010, Wye et al., 2015), alongside providing information about potential alternative policies or interventions (Hinchcliff et al., 2010). These kinds of use may have some overlap with use to report on performance measures, which has also been reported (Armstrong et al., 2006), and with use to evaluate impact of policies and interventions, which has in some cases been found to be infrequent (Campbell et al., 2009). There is mention of research helping individuals to keep up to date with developments in a field (Waddell et al., 2005, Jack et al., 2011), to back up ideas drawn from an individual's own experience (Jack et al., 2011) to support pre-existing agendas or ideas (Waddell et al., 2005, Jack et al., 2010), and to help understand preferences of those who may be affected by policies (Elliott and Popay, 2000). In some cases use is simply presented as to support decision making e.g. 36% of physicians report that economic evaluations have a major impact on healthcare decision making (Galani and Rutten, 2008) or *"[...] the purpose to reference information was to support compensation payment decisions"* (Zardo and Collie, 2014 p.3). It is worthwhile noting that in the latter referenced



study regarding use of information to support compensation decisions, this use of decision making was contrasted against use to “support policy development” (Zardo and Collie, 2014) . Decision making was found to be much more common of the two uses (Zardo and Collie, 2014) . Depending on the context of the specific study at hand, describing use as ‘decision making’ could mean that this usage in fact includes decision making on any number of the more specific aspects of policy and interventions listed above.

Some studies of use of research in policy have approached the topic by carrying out analyses of individual policy documents to assess the use of evidence. The findings of these types of study in some cases take the form of a narrative description of the policy and the evidence referenced therein, comparing this to pre-existing evidence identified by or known to the researchers. The findings are then interwoven with a discussion of how closely the chosen policy reflects existing evidence, with the authors’ judgement on this, or an attempt to understand the decision making processes and aids used by those developing the policy. Examples of this type of research include a study of UK drugs policy (Bennett and Holloway, 2010), an analysis of Swiss policy revisions (Frey and Widmer, 2011), an analysis of alcohol policy in the European Union (Gordon and Anderson, 2011), and an analysis of the impact of context on evidence use in the development of screening guidelines (Dobrow et al., 2006). It appears that the aim of this kind of research is more to determine whether or not evidence is used, or to understand the contextual factors influencing its use rather than to understand how it is used on an individual basis. It therefore proved difficult draw much information on individual information use behaviour from these studies. The lack of detail on how research is used seems to be a known problem, as a 2011 systematic review on the use of research in public health decision making commented that “*Few studies revealed the process through which research evidence was used in decision making.*” (Orton et al., 2011 p.4).

### 3.3.3 Process use

The use of research is also seen as a process in some research utilization studies. Reference to the process of use seems however to be less common than reference to decision making or conceptual, symbolic and instrumental use.

The idea of information use as a process is sometimes represented as a ladder or series of stages of using information, which participants are expected to move through. For example, a Dutch study of the use of public health memoranda perceived use in this way (de Goede et al., 2011). The ladder consisted of stages of application, influence, effort, reference, discussion, cognition and transmission. The researchers found that their participants transitioned through all stages of this ladder. In narrative terms, use was described as *"[the] report enabled them to start discussions with care providers (including the health insurer) and local authorities on the consequences of the report in terms of changes in the demand for and provision of care. Second, they had discussions with the local authorities on the consequences of the regional demographic developments for related local policy domains like social support and the health of young people."* (de Goede et al., 2011 p.15). The degree to which participants were deemed to have reached each successive stage of the ladder of utilization was measured. Among three groups of participants, which comprised Regional Public Health Service (RPHS) professionals, care providers and officials from local authorities, at least some participants in every group seem to have reached all stages of the utilization ladder. Influence seems to have been the ladder stage that was the least achievable, or possibly just the most difficult to measure. Under 70% of participants in each group were reported to have reached this stage compared to over 90% in each group reaching the stages of cognition and transmission (de Goede et al., 2011). The research also measured the following uses in percentages for different types of participant: starting point for programming research; policy evaluation; preparation of agenda for city council; development of integrated policy; general reference work; implementation of policy; preparation of public health document (de Goede et al., 2011). Of these, general reference

work, agenda preparation, development of integrated policy and implementation of policy seem to have been slightly more prevalent with 100% of participants in one group (RPHS professionals) reporting these uses (de Goede et al., 2011).

### **3.4 Barriers to information use**

Given the emphasis placed on use of evidence in practice in public health, and the supposed benefits of taking an evidence based approach to public health and public policy (Brownson et al., 2009, Straus et al., 2009), it is not surprising that along with studies that have tried to uncover the extent of research use, there have also been studies that have attempted to document the barriers to use of research in policy and practice.

Some of these barriers relate to characteristics and knowledge of the individuals experiencing them. For instance lack of awareness of the relevance of research to an issue, perceptions of the attitudes of other people as being that research was not important and difficulty understanding information (Forsetlund and Bjorndal, 2002), lack of skills in finding, understanding and/or applying evidence (Mitton and Patten, 2004, Armstrong et al., 2007, James et al., 2007, Jewell and Bero, 2008) and lack of awareness of resources in new staff (Armstrong et al., 2007) have all been noted. Other barriers seem to relate more to the characteristics of the research itself, for instance lack of relevance of research to local context or needs (Mitton and Patten, 2004, Jewell and Bero, 2008), lack of evidence more generally, particularly for new technologies (Jewell and Bero, 2008), lack of high quality research (Jewell and Bero, 2008) or doubts that it can be transferred to local context, outdated-ness of evidence, lack of evaluation data for interventions and high cost of interventions (Armstrong et al., 2007). These problems may in part reflect the challenge of evidence for public health, namely that what is considered to be high quality evidence for clinical medicine, i.e. randomised controlled trials and meta-analyses of this research within systematic reviews is often inappropriate or unattainable for public health with hierarchies of evidence as seen in clinical medicine thought to be unattainable in public health (Petticrew and Roberts, 2003). There are a number of issues in this area, including the fact that RCTs

are primarily designed to provide data on probability of success of an intervention rather than on the behavioural aspects of how that intervention will operate – these aspects also need to be considered to determine whether a public health intervention will work (Victora et al., 2004). It is also the case that the economic and social outcomes of policy interventions are not amenable to study by RCTs (Parkhurst and Abeysinghe, 2016). Typologies of evidence that have been proposed for public health explicitly acknowledge the value of a range of types of evidence for different public health questions, including qualitative research, surveys, non-experimental evaluations and observational studies (Petticrew and Roberts, 2003).

Contextual and environmental barriers have been found to include lack of time and lack of resources to support evidence based practice (Ciliska et al., 1999, Mitton and Patten, 2004, Armstrong et al., 2007, James et al., 2007, Jewell and Bero, 2008, Jack et al., 2010), resources with which to implement research findings, local and national policy climate, timeliness and current practice patterns (Ciliska et al., 1999), geographical dispersion of colleagues making peer to peer contact difficult (Forsetlund and Bjorndal, 2002), lack of internet access (Forsetlund and Bjorndal, 2002, Jack et al., 2010), lack of support for use of evidence by management (James et al., 2007, Jack et al., 2010), lack of appreciation for principles of evidence based practice outside the health field (James et al., 2007), influence of politics (James et al., 2007, Jack et al., 2010, Dobrow et al., 2006), and issues with the definition of evidence and transfer of the concept of evidence based practice from clinical medicine to public health (James et al., 2007).

The wealth of primary research and level of concern regarding barriers to evidence and research use in public health has led to two recent systematic reviews. The first, carried out in 2013 looked at the political and institutional level barriers to research use (Liverani et al., 2013). This review suggested that the centralisation of political power may have a negative effect on the open-ness of the system to research findings. It appeared that this negative impact may in part be because of the vulnerability of central government to pressure from

interest groups. The silo-ed nature of UK policy work was also suggested as a limiting factor with *“individual civil servants [...] compelled to focus on small, specific areas of policy activity, making it extremely difficult for them to engage with ideas beyond their immediate area of responsibility”* (Liverani et al., 2013 p.4).

Another systematic review of barriers and facilitators to the use of evidence in policy making, provides some indication of factors that inhibit evidence based practice, in public health but also in other areas of policy making (Oliver et al., 2014). This systematic review has a slightly different focus to the present research in part because of its focus on the context of policy making in general (rather than on public health specifically), and in part because of its focus on evidence rather than information more broadly. However, the findings of this study provided some indication of how evidence was defined (usually as research, but also including local data, personal experience and clinical expertise) and are also of interest because they provide an insight in to barriers to evidence use (Oliver et al., 2014). The barriers which public health workers experience when trying to make sense of day to day work situations was one of the original areas of interest for this thesis, therefore barriers to the use of evidence documented by a systematic review may be of interest here. The largest population groups included in the studies synthesised by this review were policy makers, 'other' (consisting of a mix of disparate individuals including commissions, health economists, third sector workers, patients, industry representatives and undetermined individuals) and researchers (Oliver et al., 2014). The key barriers to use of evidence in policy making found by the review were lack of availability of research, lack of relevant research, lack of time to use research and lack of skill in research methods (Oliver et al., 2014). Factors that encouraged or were important in promotion of the use of evidence included clarity, relevance, reliability, quality and authority of research. A large number of the individual studies synthesised here had researchers or policy makers as their population groups, and as a result the study also notes that researcher and policy maker characteristics can have an effect on evidence use. Personal experiences, judgement and values were

noted as being important policy maker characteristics (Oliver et al., 2014). Understanding of the policy process and pressure to publish in peer reviewed journals were reported as researcher characteristics (Oliver et al., 2014).

### **3.5 Conclusion**

This chapter has reported the findings of a literature review on research utilization in public health. This part of the thesis began because of a finding at the end of the review of information behaviour research reported in chapter 2, that there was relatively little knowledge of what constituted information use in public health.

Research utilization as a field is mainly concerned with the use of a certain type of information – research and/or evidence, as the studies discussed in this chapter have shown. This domain also has a theoretical framework and understanding of ‘use’ all of its own. Conceptualisations discussed in this chapter have included symbolic, instrumental and conceptual use, decision making and process use. The use of these conceptualisations make the field stand apart from that of the library and information studies research discussed in chapter 2 – perhaps LIS researchers can learn from these conceptualisations in future attempts to understand information use. However, these conceptualisations are not without problems. For instance the association between instrumental and documented use which seems to be taken for granted in some instances of research (see for example, Zardo (2015)), precludes the possibility of information being used in a way that is conceptual but also documented. Further, findings on what is the most common of the three use categorisations of symbolic, conceptual and instrumental use are mixed. Some studies report conceptual use as more common (Amara et al., 2004, de Goede et al., 2012b), while other studies report that the frequency of type of use may be associated with the type of information (Zardo, 2015). The lack of certain types of use of research shown in the results could in part be due to the way in which the concepts of use have been operationalised in different studies. This could particularly apply to studies using survey methods, where

participants are presented with questionnaire definitions of the three types of use and asked to indicate whether their experience includes use of this type.

In some cases the researchers have not set out how they are conceptualising use in their studies. For example Katikireddi et al. (2014) and Higgins et al. (2011) among others have not made clear what they understand by 'use' in their methodology. Among those researchers who do set out a clear conceptualisation of how they are defining use for the purposes of their studies, there is a split between those who require written evidence in order for use to have occurred, and those who allow that purely cognitive types of use may have occurred. For example, Frey and Widmer (2011) discuss use in terms of influence. For influence to have occurred, they state that there must have been a revision in a policy which corresponds to the content of the evidence. In contrast Kothari et al. (2011) and Kothari et al. (2012) conceptualise use in stages which include receiving, reading, processing and applying research. The focus in these studies is on tacit knowledge and the internalisation of knowledge, which is a process by which explicit knowledge is made tacit. This does not mandate that there must be written evidence of use in order to allow that use has occurred. Instead use of information that leaves written evidence is viewed as a later stage of the use process.

Decision making as a conceptualisation of use also has limitations. Again, this may in part be due to method, particularly where survey methods have been used. For example one study reported that 47% of participants used research as a basis for new recommendations for practice, and 96% in total had used them in some capacity (Dobbins et al., 2004). How did this happen? What did the participants derive from this research that helped them to make a decision? Are all decisions made using research carried out in the same way, or are there nuances to decision making processes in different situations that a more detailed exploration might uncover?

There are also limitations to some of the research utilization studies in their lack of generalisability. This can be both in terms of the type of information which is considered, and

the type of situations which are considered. Existing research on research utilization and information behaviour in public health is lacking in a number of ways. By their nature, the research utilization studies tend to view information as research, or systematic research. Types of information which fall under these headings have included systematic reviews (Dobbins et al., 2004), Health Technology Assessments (Hivon et al., 2005), and specific epidemiological reports (de Goede et al., 2012a). There may be an unstated assumption that these types of information are objective, and therefore easier to study and trace the use of. This feeling comes across in some of the methods used to gather data on use. For instance some attempts have been made to trace the use of systematic evidence through document analysis, including comparisons of available evidence to evidence which has been documented as having had some influence on policy. These methods of tracking evidence use pragmatic approaches which take into account only observable and therefore to some extent objective information use.

It cannot be assumed that the findings of these studies would apply to the use of other types of information than research. Because these studies focus on specific types of information, and use interviews and questionnaires to ask participants about their use of research, they assume that those participants are able to trace their actions directly to a specific piece of information. They also do not take into account the role that other types of information may have played in the situations described by participants. As will be discussed in the next chapter, it is not possible for a piece of information that has been read by an individual to exist in isolation because the act of reading means that the new information will come into contact with the existing knowledge possessed by the reader. Sometimes findings of research utilization studies provide little actual detail on use. For example, Dobbins et al. (2004) reported that 47% of respondents stated that their use of systematic reviews had led to the development of new recommendations, but how did this occur? Did this happen because the reviews prompted the recognition of a health issue that had not previously been recognised? Or was it the case that facts and figures from the review had shown that a



particular health intervention would be the most effective way to improve the situation with regard to a known existing health problem? A number of the studies discussed in this chapter focus on use of information in policy and strategy development, which is only one of a number of different activities carried out in public health.

Other findings of the present chapter include the challenge that it is to summarise and synthesise this literature. A range of different methods have been used to study research utilization, including surveys, semi-structured interviews, focus groups and document and citation studies. There are numerous case studies focusing on specific policy areas related to a wide range of topics including transport, alcohol, breast cancer prevention, physical activity promotion and many others. There are varying degrees of rigor in the methods with which studies are carried out. Some researchers have devoted care to defining what they mean by use (often use some of the theoretical frameworks mentioned above), while others have left their conceptualisations open or un-defined. In some cases there have been earnest efforts to make use of these conceptualisations as tools for measuring use, for instance in studies where concepts such as symbolic, instrumental and conceptual use have been directly operationalised. It appears that information use is a difficult thing to measure, because it is not always observable. The inability to make external observations of cognitive instances of use of information means that it is difficult to research and measure this kind of use. Some of the studies discussed above have turned to documentary sources of data to measure information use, including among their methods the checking of publication reference lists to draw conclusions about information use in public health. Others have concentrated on tracing the use of a specific document, or of a specific type of document. Document analysis methods can only inform us about the referenced content of the document analysed, and can not provide the data necessary to understand in detail why a particular piece of information was used in the writing of a document, and what value it had to the individual using it. Focusing on the use of one particular type or piece of information, or on one specific instance of information use, overlooks the complexity of human

information behaviour, and the way in which new information received by an individual is integrated with, and affects their existing knowledge.

Social science and communications research has been criticised for being too focused on a 'transmission model' of information communications (Dervin, 2003c). Information is thought of as bricks which can be tossed out to individuals, who are receivers (Dervin, 2003a). This may not be an appropriate model for understanding human behaviour in relation to communication and information because it assumes that information is an absolute and objective thing, whereas in fact it can be thought of as subjective and perceived differently by each individual (Dervin, 2003a). Research has shown that it is not individual traits that predict information and communication behaviour, but the situations in which individuals find themselves (Dervin, 2003a). Individuals in similar situations will ask similar questions in their attempts to move forward in their situation, regardless of whether they have similar demographic characteristics - it is the situation which is the more accurate predictor, not the individual traits (Dervin, 2003b). Therefore there is a need for a process/dynamic focus on research, rather than a state/entity focus -one that is not overly concerned with 'what's' and 'who's' and inputs and outputs of communication rather than the 'how's' of communication, i.e. the how's of how individuals use information to make sense (Dervin, 2003b). Viewing the research into information use in public health from this perspective, the research also seems to have been more concerned with the inputs and outputs of information seeking and use. This is shown in the interest in researching the use of specific types of information (inputs) such as RCTs, systematic reviews etc., and in the studies of how information appears in public health policies and strategies, which are the outputs of information behaviour. There have also been attempts to correlate individual traits with information behaviours (Larsen et al., 2012). The general focus on use of information in decision making seen in the public health literature discussed above also echoes the assumption that information is an absolute, objective tool that can be used to reduce uncertainty.

The present research will also attempt to understand the situations in which public health workers use information, and how this process occurs. While the public health workforce has not been 'blamed' for not using information or for using information in a particular way in the sense that all failings in the use of information have been directly attributed to the workforce, a lot of energy has been directed at understanding what prevents use of research and how it is used. Previous research in this area has started with a specific conception of how information should be used by the public health workforce, and this conception is drawn from evidence based medicine. This is one reason for the focus on use of research in decision making in public health – there is an assumption that this is how information, specifically research, *should* be used in public health, and the studies set out with the hope proving or disproving this kind of use. There is nothing intrinsically wrong in this approach, but this focus on an idealised scenario involving the use of research evidence for decision making has meant that there has not been much opportunity for the public health workforce as study participants to describe their use of information in terms of their own choosing, by allowing them to select and describe their own events and situations.

This research will attempt to avoid assumptions about the kind of information which is important to users, and so no special emphasis will be placed on academic research. To do this would only be to repeat what has been done in previous studies discussed in this chapter, which have looked at use of systematic reviews, technology assessments and other specific documents. The present research will instead emphasise exploring the kinds of situations faced by public health workers in their day to day work, understanding these situations, how individuals act within them to make sense of them and move forward in them.

It has been argued that information is subjective, and is perceived differently by different individuals (Dervin, 2003c). On this basis, it is recommended that qualitative methods which can elicit rich and detailed data from individuals on their experiences of interacting with information in their day to day work are appropriate for this research.

However, before describing the methodology by which this more holistic investigation of information use in public health took place, it is necessary to give some more detailed consideration to what exactly is meant by information use. As this chapter, with its reference to the multiple different conceptions of research use has shown, 'use' does not have a single meaning. Nor perhaps does 'information', or even 'research'. The next chapter will therefore be devoted to outlining existing theories on what constitutes information, information behaviour and information use as a precursor to describing the methods used to study the topic in this thesis.

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## 4 Conceptualising information and information use

### 4.1 Introduction

Information behaviour research on public health workforces has previously focused on information needs and seeking, and many of the studies found during the literature review were carried out with a view to gathering evidence for service development. As such, there was a focus on survey studies and exploring the kinds of resources needed and accessed by public health workers. Few qualitative studies of public health professionals' information behaviour or information use exist. The literature on research utilization is also limited because it seems to largely focus on a specific type of information – 'evidence' or systematic research. This kind of information seems to be thought of as objective, documented information. Some of the research utilization studies asked their participants about their use of specific types of information such as systematic reviews and seemed to assume that participants would be able to trace impacts or actions directly back to their contact with such information. This approach assumes that information is separate from the user, and exists as a 'thing', reduced to specific categories or types – the interest may be more in how often those types are used, and whether they are used rather than how they are used. As a result, the potential to develop an understanding of information use behaviour is reduced, as it becomes more difficult to see what happens in the interaction between the individual and the information. In order to avoid this pitfall, thought needs to be given to what is meant by information and information use.

The idea of information predates the modern concept of 'information behaviour' by centuries. The word 'information' is derived from Greek philosophy where its meaning was originally concerned with understanding the *form* of something, or the process of becoming informed about something (Adriaans, 2019). However, the term has historically also been used to refer not only to the possession of information which may be the result of an enquiry, but also to the act of education or enquiry itself, the process of becoming informed (Adriaans, 2019). Since its beginnings in Greek philosophy, the concept of information has taken on

many different meanings and uses, and its meaning is inextricably linked with the meaning of the more modern terms 'information behaviour' and 'information use'.

The origins of information behaviour as a field of study are thought to lie in the mid to late 20th century (Wilson, 2000). At around this time there was a change in focus of research from the use of library and information systems to the needs of individuals as they interacted with those systems (Wilson, 2000). As a result of the large amounts of scientific and technical information which suddenly became publicly available following World War II, there was a need to reach a better understanding of what would constitute good and useful methods of organising, storing and making available this information (Wilson, 2010). Early research papers on information behaviour apparently focused on the behaviour of scientists (Wilson, 1999b). The early history of what would come to be information behaviour research has been covered in articles written by information behaviour researcher Tom Wilson (see Wilson (2006), Wilson (2010)). These articles point out that, in fact, early research into what would now be termed information behaviour did not use that phrase. However, these early explorations into the area focused on the use of documents and libraries (Wilson, 1999b). It appears therefore that in the origin period of modern information behaviour research, 'information' may have been equated with physical media, and systems which organised and stored those physical media.

Information behaviour has been defined as “*the totality of human behaviour in relation to sources and channels of information, including both active and passive information seeking, and information use...it includes face-to-face communication with others as well as the passive reception of information*” (Wilson, 2000 p.49). A simple definition such as this provides little detail on what either information or information use are. It is acknowledged that information use is relatively unstudied and poorly understood (Wilson, 1981, Tuominen, 1997, Savolainen, 2009b, Kari, 2010, Bartlett and Toms, 2005), particularly in the area of what people actually do with information once found, e.g. how they use it to solve problems and make decisions (Case and O'Connor, 2016, Fidel, 2012). Despite calls for more

research on information use, it has been suggested that few research studies in this area report outcomes of information seeking (i.e. potential uses of information) other than relevance (Pluye et al., 2013). A recent review has attempted to quantify the amount of research which has been conducted into information use since the middle of the 20<sup>th</sup> century, where use was conceptualized as outcomes of information such as effects, changes in knowledge or emotional states and actions or decisions based on information (Case and O'Connor, 2016 p. 649). The review authors found that as a percentage of articles within the domain of information behaviour, 26.2% of research covered outcomes of information in 1995-1997 and 26.8% in 2011-12 – the reviewers conclude that there has been much less focus on what people do with information once they have found it than there has been on how they go about finding it (Case and O'Connor, 2016). Outcomes of information, or the value of information have been studied among clinical health professionals, and a transferrable categorization of four outcomes has been produced as a result of this (Pluye et al., 2013). Levels of outcomes have been suggested as situational relevance, cognitive impact, information use and patient health outcomes (Pluye et al., 2013). Situational relevance includes recognition that information will have value for a specific situation e.g. in answering a question while cognitive impacts included reassurance and being reminded of something; information use included use in decision making or for justification (Pluye et al., 2013). While interesting insights into the value of information in specific situations have been generated, the processes by which individuals interact with and make sense with information still seem to be less well understood. It appears therefore that there is still scope for further work to be done to understand how information is used.

As well as gaps in knowledge about information use there are also problems with terminology around information use, as the terms use and utilization are often used interchangeably, and without clarification of their meaning (Todd, 1999a). There are multiple, confusing definitions of information use, some examples include: “*seeking behaviour that leads to the use of information in order to meet an individual’s needs*” (Bouzza, 1989);

*"[...] people 'doing something' with information"* (Todd, 1999a p.852); *"to listen, to look at, to read; in short, it is its reception and, if possible, the full or partial understanding by the recipient"* (Machlup, 1993 p.63). It has been said that there are no limits to the kinds of interactions with information which can be referred to as information use (Kari, 2010). It seems that the only thing which is agreed on with regard to defining information use is that there is no agreement on this definition (Savolainen, 2009b, Todd, 1999b, Rich, 1991).

With regard to the study of information behaviour, two broad approaches have predominated: cognitive/constructivist and information processing (Savolainen, 2009b). The cognitive/constructivist approach aims to understand how an individual's perceptions of their world affect the way in which they relate to new information, and how new information in turn affects their perceptions of the world (Wilson, 1984). The information processing approach is associated with decision making (Savolainen, 2009b). The cognitive/constructivist approach seems to have been the more popular of the two for information and library scientists. A number of well-known theories of information behaviour, including Brookes' ideas in relation to knowledge modification and his fundamental equation and sense-making theory are thought to have their roots in the constructivist approach (Savolainen, 2009b), although there are also some similarities between the theory of knowledge modification and information processing.

During the early stages of this research, various models and theories of information and information behaviour were consulted in an attempt to conceptualise information use in a holistic way that would allow for a more open-ended approach to researching the subject than had been evident in existing research utilization literature. The latter half of the twentieth century saw a proliferation of models, methods and theories relevant to information and information use, including sense-making, knowledge integration and cognitive theories of retrieval. This chapter presents a discussion of some of the most influential of these theories. For the most part this discussion is ordered roughly chronologically, with theories presented in date order according to the time at which they first began to develop. The

exception to this is the original theory of 'human information processing'. Information processing theory began to develop in the 1960s, and was originally not intended to be a theory of information behaviour, being instead concerned with memory storage and retrieval (Izawa, 1999). Its influence on information behaviour seems to be more apparent from the 1980s and 1990s onwards. For that reason, the original information processing theory is discussed later in the chapter alongside the information behaviour theories which it seems to have influenced.

At each stage of the chapter theories on information and its use are considered critically, and the chapter concludes with a rationale for the choice of the sense-making method conceptualisation of information and information use as the most appropriate to the goals of this research.

## **4.2 Sense making**

One of the earliest models or theories of information use to develop within a clutch dating from the late 1970s and early 1980s was the conceptualization set out in Dervin's sense-making methodology. By 1983, when Brenda Devin presented an overview of the methods of sense-making at a conference, this method had been in development for 8 years already (Dervin, 1983). Dervin recalls that her ideas about sense-making began to develop in 1972 (Dervin, 2003f). During her early career Dervin studied and worked in communication related fields, including journalism and public information, and describes sense-making as "*a generalizable communication-based methodology*" (Dervin, 2003d, p.vii). Whereas it appears that the earliest research on information behaviour was mainly concerned with the behaviour of scientists and professionals (Wilson, 2000) operating within the realm of research or professional work, sense-making methods developed through research with a wider range of audiences, involving diverse groups such as the urban poor (Greenberg and Dervin, 1970) and urban residents (Dervin and Communications, 1977).

Sense-making proposes that information is a dynamic entity that is continually in flux. The methods of sense-making represented a move away from what were the predominant historical approaches to conceptualising communications with users, which tended to view users as empty-buckets, into which information could be thrown (Dervin, 2003b). Sense-making recognised that individuals can be 'designers' of information rather than storage containers of static information (Savolainen, 2006). In sense-making, information changes from one moment to the next because the needs of the individual and the use to which that information is put are continually changing, and no two individuals experience the world, or information, in the same way (Savolainen, 2006). Information in sense-making is the understanding that individuals create at specific times and places in their lives, in order to enable them to move forwards through time and space (Dervin, 1992, Dervin, 1983). Sense-making states that individuals interact with information to bridge gaps which they perceive in their understanding of the world (Dervin, 2003a), and use information to move through time and space in the situations in which they find themselves (Dervin, 2003c). Use is equated with the way individuals develop sense and understanding through interactions. The outcomes of this can be either hurts or helps – the information has either helped the individual to make sense of their situation, or has hurt or caused them more problems. Information is therefore subjective, and is something that happens to an individual at a particular place and time, intrinsically linked to their personal viewpoint and experiences of their situation. Categorisations of use suggested in sense-making include cognitive uses, e.g. 'got ideas/understandings', 'got skills', 'reached a goal' as well as more emotional purposes such as 'got calmer' and 'took mind off things' (Dervin, 2003f).

Through the 1980s sense-making began to influence other models of information behaviour, including Kuhlthau's information seeking and information search process model (Kuhlthau, 1991, Kuhlthau, 1990, Kuhlthau, 1988). Wilson also referenced Dervin's sense-making literature, apparently seeing sense-making as a model of information seeking (Wilson, 1999a). It is interesting to note that in both of these cases, information behaviour



researchers have drawn on sense-making as a way of framing and conceptualising information seeking rather than information use, despite the fact that sense-making does also have direct applicability to the conceptualisation of information use. However, the link between sense-making and information use does not seem to have been explored in information use research until the 1990s. In a 1999 paper on information use the way in which sense-making depicts information use as a constructive activity is described (Todd, 1999a).

Sense-making has advantages and disadvantages as a conceptualisation of information and information use. Sense-making provides a very loose, open conceptualisation of both information and information use. The way in which sense-making conceptualises information as being dynamic and designed by the user could make it difficult to define the entity that is being researched, perhaps particularly for a novice researcher. If using a sense-making conceptualisation of information and information use, to (as in this thesis) interview participants about their interactions with information, there may be a risk of the researcher losing control of the interview. This could result in data which covers a very disparate range of entities all classed by participants as 'information', and a very disparate set of 'uses'. It is possible that the use of such an open conceptualisation as a framework for the design of a research protocol could also cause problems to arise in the data analysis. Sense-making studies usually avoid using the term 'information' when communicating with participants, because of its association with facts seen as coming from an authoritative source (Dervin, 2003e). This approach has advantages in that it can prevent assumptions being made about the kind of 'information' that is of interest during research, but avoidance of the use of specific terminology, and the resulting diversity of data which could ensue from this approach may also cause difficulty in analysis, for instance in deciding which elements of the users' experience might refer to 'information' and which might refer to the use of that information.

### 4.3 Research utilization

At around the same time as Dervin began developing sense-making as a set of methods for studying human communication and information behaviour, another, parallel stream of research, also relevant to information use was developing - research utilization or knowledge translation.

Research utilization as a discipline has been concerned with proving the usefulness of social science research for public policy since the 1970s, when research on the area began. The link between research utilization and information use is immediately clear where research is seen as a type of information. In part this concern for finding proof of use seems to have stemmed from a need to prove 'usefulness'. Carol Weiss, a researcher who has been influential in studies on research utilization mentioned this in her seminal 1979 paper, linking the need to prove use of research to the use of government money to fund that research (Weiss, 1979). Weiss proposed several models of the way in which research is used in public life, including the knowledge-driven model, the problem-solving model, the interactive model, the political model, the tactical model and the enlightenment model (Weiss, 1979). Two of these models share something in common - a view of research as 'evidence'. The 'Problem-solving model' states that research is expected to provide "*empirical evidence and conclusions that help to solve a policy problem*" (Weiss, 1979 p.427). In this model research is seen as a basis for decision making, particularly in terms of how to take action, e.g. what intervention or policy to introduce or how that intervention should operate. In the 'Political model', research is again seen as evidence, but this time that evidence is being used as ammunition, part of an attempt to persuade or alter entrenched beliefs: "*Partisans flourish the evidence in an attempt to neutralize opponents, convince waverers, and bolster supporters*" (Weiss, 1979). The kinds of impacts with which this form of use is concerned are external to and separate from the user – these impacts or outcomes belong to the wider world, and are quite different to the kind of sense-making information uses (which seem much more personal to the individual) referred to earlier in the chapter.

Research utilization inherently assumes that it is possible to identify specific outcomes and link these outcomes directly back to research or other information. This suggests a rational view of the world, marginalising the influence of the individual during interactions with information. This emphasis on the role of information rather than the role of the individual can be seen in some of the models of research utilization which developed following the 1970s. One such model is the seven stages model of utilization, which defines each stage as a form of use in its own right (Knott and Wildavsky, 1980). The stages of this model depict different interactions with information and consist of Reception, Cognition, Reference, Effort, Adoption, Implementation, Impact (Knott and Wildavsky, 1980). These stages are a mixture of cognitive, personal actions such as reading and digesting and more external interactions which may involve other people, such as the adoption of a research recommendation in a policy. Although there is a clear role for the individual within the stages of this model (for example in stages which consist of consideration of information through cognition the individual is thought to read and digest information), there are also stages where the role of the individual does not seem to be acknowledged, and it appears that information acts alone to make change (Knott and Wildavsky, 1980). This is seen in the reference to information changing individual views, which is said to occur during the 'Reference' stage: "[...] *utilization must change the way the policy-maker sees the world. If information changes his preferences, or his understanding of the probabilities or magnitudes of impact [...] utilization is a reality*" (Knott and Wildavsky, 1980 p.546). This overlooks the role of the individual, something which other conceptualisations of information use such as sense-making represent far better.

The emphasis on external impacts and proving use may also have led those studying research utilization to focus on observable uses. For example, it has been argued that: "*The reading of evaluation reports, for example, is not utilization... To be considered used there must be evidence that in the absence of information, those engaged in policy or program activities would have thought or acted differently.*" (Leviton, 1981 p.527). This example

suggests that unless an observable change occurs in the real world, use has not occurred. A personal cognitive action such as reading is not counted as use. However, other researchers working in this area acknowledge that 'use' may mean something quite different to impact: *"Use may simply mean that information has been received and read; it does not necessarily imply that information has been understood [...] Impact is more action oriented. In this case information has been received, understood and has led to some concrete action, even if that action is to reject the information."* (Rich, 1997 p.15).

Another way of conceptualising research use which has been popular with those studying research utilization is the categorisation of use by types of instrumental, conceptual and symbolic (Rich, 1997), as discussed in chapter 3. *"Instrumental use involves applying research results in specific, direct ways. Conceptual use involves using research results for general enlightenment; results influence actions but more indirectly and less specifically in instrumental use. Symbolic use involves using research results to legitimate and sustain predetermined positions"* (Beyer, 1997 p.17). These categorisations have been criticised as *"primitive"*, because they are not seen as possessing the granularity or sensitivity to present a really detailed picture of how information is used (Rich, 1997 p.18). These categorisations also present a challenge to research, as for uses falling into the conceptual class, it may be difficult to determine exactly how an individual has used a piece of information, particularly when that use has occurred purely internally to stimulate a change in thinking. The individual themselves may not be fully aware of all the uses to which they put a piece of information, as it is thought that a large amount of human information processing is unconscious (van Gaal et al., 2012). The question of whether we can ever be fully aware of the influence or effect that a piece of information has on our thoughts, understandings and knowledge is an important consideration for conceptualising use. If the answer to this question is (as it appears to be) 'no', this is clearly a problem for the extent to which we can ever hope to assess the cognitive use of information. However there is no universal agreement on this point, and there are some methods which have been applied to understand information use

which are based on the idea that individuals have some awareness of the way in which they cognitively use information whilst using it. Think aloud methods, for example, which involve a participant verbalizing their thoughts out loud, assume that human thought is equivalent to information processing and that when an individual information user takes in new information, that information processing is accessible to another person through verbalisations of the information user (Ericsson and Simon, 1984).

Research utilisation models, while acknowledging that personal and internal 'uses' of information occur, really seem to be more interested in real world impacts that show direct, definable outcomes. Several researchers in this area describe different levels of use, with tasks such as reading and thinking often seen as a lower level of use, while impact and influence are seen as higher levels of use. This implies a value judgement on the kind of use that is important. In combination with the desire to prove value for money in research, and return on government investment, this could lead to lower level uses (which might be very important to understanding individual behaviour) being overlooked in favour of the more headline-grabbing 'impact'. Research utilization models of use have been developed to represent the way in which research findings might be used in public policy making. Such models are best seen as perspectives on the utilization of scientific research as intended by the context for which they were originally developed, research utilization. These models are by nature specific to a certain type of activity and information. While they may be helpful to developing understanding about some aspects of information use, they only tell part of the story. These frameworks of use may not fit interactions with forms of information other than research, or uses that occur in situations other than the development of policy recommendations. Perhaps the most useful aspect of research utilization models of information use is that they draw attention to concepts such as influence and persuasion as uses which may be present in public policy including areas such as public health policy.

At a deeper conceptual level, it is also notable that the distinctions drawn between different forms of use in research utilization are roughly parallel to a distinction between objective and

subjective uses, and observable and cognitive uses. The kind of real world impact which those studying research utilization seek to discover and capture may be more akin to an objective use, because they are by definition observable in some external way. This leaves personal, subjective uses as the disregarded poor relation. This is in direct contrast to sense-making, where individual, personal use is emphasised. This contrast is interesting given that research utilization theories and sense-making methods have developed over the same time period. While it may be understandable that researchers seeking to prove the value of research may seek objective, observable uses that cannot be argued with, for a study of individual information behaviour such as the present thesis, there is no obvious reason why data on personal subjective uses of information that don't necessarily result in major changes impacting on the external world should be of less value. The requirement that some research utilization theories propose, that information must result in change in thinking to be used also has implications for the status of confirmatory use, which could be excluded. An individual could take in information by reading a new source which they have never encountered before and find that this information is just as useful as something ground breaking, simply because it verifies an idea which they already hold. The information would be no less used than something which led to a completely new idea.

There is also the issue of timing and gradation or magnitude of change to consider. Just because contact with new information does not immediately result in a major change in thinking, that doesn't mean that thinking could not change at a later date after further reflection. In addition, if use has only occurred when a change in thinking has occurred, how is 'change' defined? Should there be a change threshold, below which use is not recognised? Lastly it is also possible that in fact the subjective, personal uses which tend to be de-emphasised in research utilization account for a much larger proportion of individual uses of information than the more glamorous sounding impact or influence uses.

#### 4.4 Domain maps of information behaviour and the fundamental equation

Following the development of ideas about what it means to use information in the fields of communication research and research utilization, attempts were made to map out the territory of information behaviour, and elsewhere to lay theoretical groundwork for the discipline of information science. These attempts would further add to the debate about how to conceptualise information use.

Information behaviour researcher Tom Wilson began publishing models of information behaviour in the early 1980s, beginning in 1981 with two models - a model of information seeking paths, and a separate model which acts as a domain map of the information behaviour field, presenting relationships between different elements of behaviour such as needs and seeking (Wilson, 1981). Wilson suggests that information includes physical entities such as books or journals, channels of communication through which messages are conveyed and factual data empirically determined and presented either orally or in writing (Wilson, 1981). Wilson's domain map indicates that information behaviour was being thought of as broken down into different sub-topics such as seeking, needs and use. This helped to highlight the relative neglect of information use as a research topic (Wilson, 1981).

Attempts to develop a theoretical groundwork of information science included the development of a 'fundamental equation' and the use of Popper's conceptualisation of the worlds of objective knowledge and subjective mental states to define information and knowledge (Brookes, 1980b). The world of objective knowledge contains the *"products of the human mind as recorded in languages, the arts, the sciences, the technologies - in all the artefacts humans have stored or scattered around the Earth"* (Brookes, 1980b p.127) The world of subjective mental states contains human knowledge, thoughts and feelings (Brookes, 1980b).

The fundamental equation was an attempt to describe what happens when an individual takes in new information. In the terms of this equation, all individuals possess a knowledge structure, and when the individual interacts with new information this results in a change or modification to that knowledge structure, at the end of which a new version or update of that structure has been created. Brookes stated that “*The absorption of information into a knowledge structure may cause not simply an addition but some adjustment to the structure such as a change in the relations linking two or more concepts already admitted*” (Brookes, 1980b). This implies two possible cognitive changes as a result of information - simple additive changes in knowledge, i.e. the gaining of new knowledge and changes in thinking. The resulting changes in the theorized knowledge structure could include movement of concepts, the making of new links, or breaking of old links. A new idea might develop, or an old idea might be questioned or discarded altogether. The changes in knowledge structure that can occur as a result of contact with new knowledge have been applied as a conceptualisation of information use (see Todd (1999a)). A study published in 1999 referenced the fundamental equation, and during data collection asked participants to draw mental maps of their knowledge on a topic before and after exposure to new information (Todd, 1999b).

The fundamental equation and the application of Popper’s theories of worlds of objective knowledge and subjective mental states present a way of defining the concepts of knowledge and information through their relationships to one another. Brookes describes knowledge as “*structured integrated information*” and information as “*fragmented knowledge*” (Brookes, 1981 p.11). Knowledge is perceived to be made up of pieces of the smaller 'information'. Information can be transformed and integrated into knowledge through 'modification'. Several further ideas and theories about the meaning of information published in the 1990s also contrast information against data and/or knowledge whilst defining these concepts. As will become apparent in the remainder of the chapter, these definitions also imply a something about what constitutes 'use' of information.



The ideas put forward by Brookes and Wilson also straddle the ideas found in sense-making and research utilization, as they share common themes of objectivity and subjectivity as characteristics of information use. In sense-making, both information and its use are seen as subjective. Research utilization theories focus more on objectivity, both in the form of information with which they are concerned (scientific research generally being thought of as objective) and the uses of that information. Subjective uses are implicitly recognised but are seen as less important or interesting. In Wilson's work, this distinction is seen in the recognition that *"The word 'information' is used [...] to denote a physical entity or phenomenon [...] the channel of communication through which messages are transferred (as when we speak of the incidence of oral versus written information), or the factual data, empirically determined and presented in a document or transmitted orally. The situation is further complicated by the fact that distinctions may or may not be made among 'facts', 'advice' and 'opinion'"* (Wilson, 1981 p.3). Whilst Wilson does not explicitly refer to objective or subjective information, the terms fact and opinion have strong connotations in that direction. Brookes' application of Popper's worlds of objective knowledge and subjective mental states suggests similar thinking on physical/objective entities such as books and intangible/subjective entities such as opinions which may be transmitted orally.

#### **4.5 Information processing and information defined through relationships with data and knowledge**

As attempts to conceptualise information and information use continued into the 1990s and early 21st century, the influence of information processing theory and ideas about cognitive processes by which information is transmuted into knowledge (such as Brookes' fundamental equation) became more noticeable. In fact, the 'modification' which incorporates information into a knowledge structure in the fundamental equation could be interpreted as a form of processing, suggesting the influence of information processing theory on the fundamental equation.

Currently, human information processing is acknowledged as one of two broad approaches to studying information use (the other being the cognitive/constructivist approach) (Savolainen, 2009b). Human information processing theory was first developed in the 1960s, when what came to be known as the modal model, or the Atkinson-Shiffrin model was developed. This model is grounded in psychology, and is concerned with decision making, short and long term memory, and the processes used to access memory, which include what might be thought of as mechanisms for remembering such as rehearsal and selection of cues for retrieval (Izawa, 1999). While the original information processing model is not a model of information use or information behaviour, it shares some common ground with information processing as an approach to the study of information use, and has influenced this approach. Information behaviour researchers have, for example, summarised the information processing approach to studying information use as being concerned with storage and retrieval of information in memory, judging of cues and making of decisions and choices (Savolainen, 2009b). Information processing has also been used to refer to the incorporation of information into a user's 'framework': "[...] *information will be "processed" (i.e. incorporated into the users' framework of knowledge, beliefs or values) or used (i.e. lead to changes in the user's state of knowledge, behaviour, values or beliefs)*" (Wilson, 1997 p. 567).

The fundamental equation may have been one of the first of a series of models and definitions which presented information and knowledge as structures composed of nodes or pieces making up larger wholes. While the fundamental equation made reference to only two concepts (knowledge and information), other theories developing in the 1990s and 2000s add a third concept, data, into the structure. One simple definition, drawn from research utilization literature states that: "*Data is meant to be the most rudimentary unit of analysis...Information goes beyond data. Information is thought of as refined data which provides some added value to the user*" (Rich, 1997 p.14). Another definition in a similar vein describes two types of information, and also knowledge as a separate entity. Information 1 is

the “*pattern of organization of matter and energy*”; information 2 is “*some pattern of organization of matter and energy given meaning by a living being*”; lastly knowledge is “*information given meaning and integrated with other contents of understanding*” (Bates, 2006 p.1036).

Although the terminology differs (the second definition prefers to suggest two types of information rather than using the term data for one of the types), the similarities in conceptualisation between these theories and the fundamental equation and information processing are notable. In each case there are at least 2, and sometimes 3 levels or categories of entities. In each case some form of work or processing takes place which results in a movement between these levels or categories, i.e. the transformation of data into information, or information into knowledge. Wilson's description of information processing as involving the incorporation of information into a user's existing framework (Wilson, 1997) is very similar to the fundamental equation.

These definitions suggest that information is a constituent of knowledge (Savolainen, 2009a), and can be understood to define the concepts of data, information and knowledge in part through their relationships with one another. The conceptualisation of 'integration' (Bates, 2006, Brookes, 1980b), 'processing' (Wilson, 1997), 'giving meaning' (Bates, 2006) or 'modification' (Brookes, 1980b) as acts which may elevate an entity from the level of data to information or information to knowledge also has implications for information use. These acts of processing have elsewhere been interpreted as a form of use (Kari, 2010). Where this conceptualization has been applied, processing is thought to include understanding, analysis, cognition, adoption and modification among others (Kari, 2010). In terms of understanding what information is, such definitions suggest that anything which can be perceived, processed and given meaning by a living being is either data or information (depending on its existing level of meaning). The level of meaning or integration required seems to separate data from information and information from knowledge, with knowledge

apparently the ultimate, highest level of conceptualisation which has the most meaning attached to it.

Any definition of information use which lists understanding or processing as a form of use can be interpreted to include subjective, invisible forms of use. These subjective forms of use are undoubtedly more difficult to observe and measure than objective forms, and therefore present a research problem. A similar issue arises when considering objective and subjective forms of information use. Objective information has been defined as that which is recorded in some way (Brookes, 1980b). Information which has a physical record can be observed, it can be seen or heard or touched. This feeds into objective forms of use - if that which is being used exists in physical objective form, it will by definition be easier to observe at least some elements of the use of that form.

Relationships between data, information and knowledge would appear to have been thought of as a helpful way of conceptualising these entities through differentiation, as several researchers have presented conceptualisations on this basis. However, there may also be difficulties in applying these relationships to create definitions. These difficulties arise where there are differences of opinion as to what constitutes data, information or knowledge.

Several models exist that make references to physical and mental ways of understanding these phenomena. In addition to basic type 1 or type 2 information and data, information has also been categorised into types of neurocultural information and exosomatic information (Bates, 2006). Neurocultural information is any information encoded within the brain, and subdivides into experienced information (which includes our subjective experiences of the world around us), enacted information (which seems to relate to the society or culture that we create through the practical application of our intellectual and physical abilities) and expressed information (essentially communication via verbal or non-verbal means) (Bates, 2006). Exosomatic information breaks down into sub-categories of embedded information (the observable evidence which our interactions with the world leave behind) and recorded information (anything recorded through our use of language, symbols and artistic works,

including audio and photography) (Bates, 2006). The definition of exosomatic information has some similarities to views on the nature of documents as items which represent a record of a physical or intellectual phenomena and provide factual proof of that phenomena (Buckland and Lund, 2013, Briet and van Bon-Martens, 2006). This definition therefore clearly also includes both physical and intangible forms of information, as it covers both information present in physical artifacts, but also that which is stored within our minds. The clash of terminology between different theorists is apparent here. One researcher's 'exosomatic information' (Bates, 2006) is another researcher's 'objective knowledge' (Brookes, 1980b). The definitions of these two entities both include physical, documented artifacts such as books, yet one is information while the other is knowledge. These differences in terminology may represent a difficulty in distinguishing between something which is objective because it exists in physical form, and something which is objective because it is thought to be an absolute truth. Whatever the cause of this difference, the fact that there is not yet an agreement on what constitutes information and what constitutes knowledge presents a challenge for any conceptualisation which defines these concepts by comparing and contrasting them, or relating them to one another.

It has been suggested that one obstacle to understanding the difference between information and knowledge is our inability “*to distinguish between the process of information and the contents of the message, that is, the knowledge transmitted*” (Machlup, 1993 p.449). In fact, the idea of information as a process rather than an entity has been in existence for centuries– the process of becoming informed (Adriaans, 2019). If information in itself is a process and therefore a kind of use, do we need separate terms for information and information use, or are they actually the same thing? Where does information end and information use begin? If information is seen as a process, it can be likened to a delivery service – with knowledge being the thing that is delivered (Machlup, 1993). This further complicates the picture, with regard to the relationship between data and information. Depending on the theory consulted, information can be either a process, or something that

results from a process. If such conceptualizations are taken together with definitions of information that describe it as processed data and as something which can be processed into knowledge, information is actually created through use of data, and knowledge through use of information - it is both process and processed.

As with the various models of information and use discussed earlier in this chapter, the theme of objective vs. subjective information is also apparent in some of the definitions which appear to have been influenced by ideas about information processing and relationships between data, information and knowledge. It has been suggested more than once that information should be defined as an objective entity, even though the same definitions include classes of subjective information (see Brookes (1980b) and Bates (2006)). It is argued in such cases that any subjectivity introduced into our dealings with information comes from us, as individuals with unique and subjective experiences and perceptions (Bates, 2006). What importance, if any, do objectivity and physical form have for defining information, and what does this mean for information use? Is it right to disregard subjective information, when according to the definitions referenced above it forms a whole class or world of knowledge? Admittedly it is possible that certain types of information may only have an objective existence – depending on how inclusive the definition of information used is. Genetic information is one of the types of information mentioned in the pattern and organization of matter theory of information (Bates, 2006). Perhaps this form of information is objective – it exists everywhere within our bodies and the environment around us. It may be true to say that our genetic information does not change with our day to day experiences. However, considering the kind of information in which we are likely to be more interested, during, for example a study of information behaviour in public health, the same can not be said. Much of the information in our world has arisen from ourselves or from other humans at some point in the near or distant past – therefore it could be argued that all such information is subjective at its point of origin, having arisen from flawed, subjective individuals. Brookes acknowledges this as a problem with an objective view of information, and does not seem to

have suggested a solution (Brookes, 1980b, Brookes, 1980a).

#### **4.6 Cognitive information retrieval theory**

Further ideas on the conceptualisation of information and information use can be extrapolated from Cognitive Information Retrieval theory which was proposed in the 1990s (Ingwersen, 1996). This theory suggests that there is an important difference between machine and man in terms of information retrieval. Firstly, the theory points out the difference between human and machine capabilities in processing information. Both entities possess a world model which can influence how they handle, or process information. However for humans, this model consists of *“highly dynamic and interchangeable cognitive structures...the current cognitive/emotional structures and states are determined by the experiences gained through time in a social and historical context”* (Ingwersen, 1996 p.5). In contrast, for machines, or automated processing engines, *“the world model is dynamic, but not self-contained. It consists of the human cognitive structures embedded in the system prior to processing...processing will only take place at a linguistic sign level of communication – never at a cognitive level”* (Ingwersen, 1996 p.6). Cognitive Information Retrieval (CIR) theory seems to have been influenced by Brookes’ ideas on knowledge and information, as the theory uses similar ideas to those of the fundamental equation to explain the differences between machine systems and humans. However, CIR theory also suggests some divergence from Brookes in terms of what it implies about the existence of objective information. Through this divergence CIR theory may echo some of the ideas about the subjectivity of information, which are emphasised by the sense-making methodology.

CIR theory suggests that for something to become true information, it must result in the transformation of knowledge states or internal cognitive structures – states and structures which only an animal, non-machine entity can possess (Ingwersen, 1996). 'Information' in this theory has to satisfy two conditions – it must be the result of a transformation of the knowledge structures of the entity that generated it, and it must also result in a transformation of the state of knowledge of the entity who receives it (Ingwersen, 1996). This

sounds quite subjective because individual knowledge structure transformations will be just that - individual. Two different individuals reading the same written account may have quite different interpretations of that information. If we take those 'interpretations' to represent the knowledge structure transformation referred to by CIR theory, then the fact that transformations will differ for different people means that transformations are subjective, knowledge structures are subjective and the information which comes into being through transformation is subjective.

As the automated processing engine suggested in this cognitive theory is not capable of cognitive processing of information, it is therefore unable to truly transform its world view as a result of new information. In an automated system, information exists only in a symbolic form – perhaps this means that it has no true meaning or existence until interpreted by a thinking (human) entity. CIR theory suggests that information stored in an automated system is "*potential information*" rather than true information (Ingwersen, 1996 p.7). It can be assumed that this potential information would fall into the class of objective physical information suggested by Bates and Brookes.

Therefore, it can be argued that information is not information without our subjective interactions with it. CIR theory seems to be suggesting that for true information, meaning is required. We as individuals provide that meaning, and this meaning is subjective, because it is individual. As such, is it really possible to regard true information as objective? A collection of signs and symbols may be objective, but perhaps this is not really information. The distinction drawn between machine and man in the cognitive theory (Ingwersen, 1996) seems to be a distinction between the capacity for conscious thought and the lack of that capacity. The theory states that this is what separates us from machines (a fact that few of us would dispute), and that information can exist only as a result of conscious thought. If subjectivity is considered to describe the human capacity for personal reflection, idea and opinion in relation to the world then conscious thought must be linked to this. This in turn could suggest that individual conscious thought is by nature subjective – and subjective



thought processes are the only way in which information can be created. Cognitive information retrieval theory can therefore be interpreted to support the sense-making conceptualisation of information as subjective and designed by the individual.

CIR theory therefore once again emphasises the importance of the individual in the process of assigning meaning to and creating information. Sense-making began this journey toward recognition of information as dynamic and context dependent in the 1970s. Over the subsequent decades, counter theories of information were put forth suggesting that information should be viewed as objective in order to be made subject to scientific study (Brookes, 1980b). However, even as these suggestions were made, the potential problems of classing anything produced by other human beings as fully objective were acknowledged (Brookes, 1980b). These problems have never been resolved. As a theory of information retrieval, CIR theory was not intended to set out a specific conceptualisation of information use. The conceptualisation of use explored above (the incorporation of information into existing frameworks and the development of meaning through this action) is extrapolated from CIR theory based on interpretation of that theory which has been informed by the study of other theories of information behaviour. As it was originally intended to propose a way of thinking about retrieval of information, CIR theory does not provide the level of detail of conceptualisation of information use that is present elsewhere, specifically in sense-making methodology. Sense-making is able to provide additional and more encompassing views on information use, by fleshing out what may constitute the development of meaning through use through categories of use such as the attainment of goals or emotional supports (see section 4.2). The idea of information use as meaning making has appeared as a common thread in several of the more influential theories of use discussion in this chapter, appearing in both information processing approaches and CIR theory. However, this idea of use as meaning making as use is most fully encompassed by sense-making theory. This chapter will therefore now conclude with a final argument in support of sense-making as the most

holistic and flexible approach to conceptualising information use, and therefore the most appropriate choice of conceptualisation for the present research.

#### **4.7 Conclusion: An argument for sense-making as a conceptualisation of information use**

This chapter has explored various conceptualisations of information and information use, highlighting a number of problems through the discussion of these conceptualisations. There is confusion between information and knowledge, and whether information is a process or a thing. Whether or not information and its use should be limited to that which is objective, physical, observable or has real world outcomes, or should include cognitive use and subjective information is another key issue. Conceptualising information as an objective thing, as suggested by some (Brookes, 1980b, Bates, 2006) could result in research with a narrow field of view, excluding the use of cognitive information. Despite suggestions that information science should adhere to a theory of information that excludes subjective information, it has also been suggested that a theory of information suitable for information science should not take account of physical items such as books or documents, because it is actually the knowledge contained within which is really of interest, and information and knowledge should only be analysed as *“purely mental entities”* (Brookes, 1980b p.132). It has also been suggested that we should attempt to study the interaction between objective knowledge and subjective knowledge (Brookes, 1980b). This is interpreted as meaning that we should attempt to study the way in which individuals mediate a relationship between their own personal knowledge, experiences, prejudices and opinions and the contents of what some regard as ‘objective knowledge’. If such research is to be carried out, a conceptualisation of information use is required which encompasses subjective uses of information. Sense-making fulfils this requirement. The call for the study of mental entities and interactions is a contrast to the kind of research exemplified in the majority of public health user studies carried out in Library and Information Science (reported in chapter 3), which as highlighted previously have tended to concentrate on examining use of physical

items. It also contrasts with research utilization studies of public health workers, which as discussed in this chapter tend to be based around use theories which emphasise 'real world' impacts and outcomes. The limitations of such studies in terms of understanding individual information use were highlighted in the conclusions of chapters 2 and 3 of this thesis. If, as suspected, these limited existing studies are based on more objective conceptualisations of information and information use, then it follows that any attempt to improve upon this research, and generate new insights should attempt to use a conceptualisation that allows for subjective information and subjective uses. Once again, sense-making fulfils this requirement.

Sense-making methodology is also helpful because it suggests that the distinction between knowledge and information is not important. As discussed earlier in this chapter, this distinction is problematic when it comes to defining information and knowledge, partly because there is a lack of agreement on what constitutes information and knowledge. Sense-making suggests that to define information and knowledge as separate concepts is meaningless because they are not experienced in this way by an individual (Dervin, 2003f, Dervin, 1998). Given the confusion between information, knowledge and information use described earlier in the chapter it is very helpful to have a conceptualisation which can set this confusion to one side. Sense-making also avoids placing special emphasis on either tangible or invisible use. Its categorizations of use (e.g. got ideas, able to plan, got skills), could in many cases involve both cognitive and physical, observable use. Sense-making views of information and information use help researchers to move away from conceptualisations that are limited to physical, objective and observable phenomena because the sense-making definitions of information and use incorporate information which is not tangible and use which is not visible.

This chapter has presented a discussion of some of the most influential conceptualisations and theories of information and information use which have been discussed in library and information science literature and applied in information behaviour research from the 1970s

onwards. Having selected sense-making as a holistic conceptualisation of information and information use which is appropriate to the goals of this research, the next chapter sets out the methods and protocols for this thesis. This includes further discussion of the underlying assumptions of sense-making, and information on the details of some of the techniques used in sense-making studies, and how these will be applied in the present research.

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## 5 Research methodology and methods

### 5.1 Introduction and research questions

This chapter describes the methodology and methods of this research. It also provides an explanation and rationale for decisions about the methodology, including study population, sampling strategy and data collection and analysis methods used.

The literature reviews discussed in chapters 2 and 3 found that studies relevant to information use of public health workers were divided between two fields – knowledge translation/research utilization and library and information science. Much attention had been paid to use of peer reviewed academic research in specific instances of decision making and policy and strategy development and implementation. There were also instances of research which focused on *what* information was used rather than *how* it was used. Therefore, the existing research relevant to the use of information in public health provided a limited picture of the behaviour of public health workers. What was missing was research into the use of information in public health in a more holistic sense, taking account of how information in a more general sense (not limited to research) may influence thinking and ideas, as well as the use of information for external, observable purposes. Research utilization has an agenda of proving the usefulness of academic research in public health. Information use studies originating from LIS meanwhile are few and far between, as the focus has primarily been on information needs and seeking.

Chapter 4 highlighted calls from other researchers to study the interaction between what has been described as the world of objective knowledge and the world of subjective knowledge (Brookes, 1980), and a need for a holistic conceptualisation of knowledge, information and use. This has been interpreted here as a call to study the way in which we as individuals mediate between our own personal ideas and experience (subjective knowledge) and the stores of knowledge that exist in the physical world, held in written and other forms. This interaction became the point of interest in the present study, within a particular social culture – that of public health work in the UK. Chapter 4 concluded with the decision that sense-

making as defined by Brenda Dervin (Dervin, 2003g), provided a useful, holistic and unlimited conceptualisation of information use on which to base a study. The combination of a literature review on information behaviour and research utilization in public health, and the realisation of the conceptual difficulties which seem to have beset the area of information use led to the development of the following research questions, which have been framed within the sense-making method conceptualisation of information use. The overarching aim of finding answers to these questions was to understand how information is used in public health work in the UK:

1. What situations and gaps in understanding do public health workers experience in their day to day work?
2. How do public health workers use information to make sense of their situations and progress in their work?
3. What barriers do public health workers experience when trying to make sense of situations they face in the workplace?

## **5.2 Research paradigm and methodological approach**

The history of the field of information behaviour studies extends back to the 1940s (Wilson, 1999). Initial research in the field has been criticised for providing little insight that would support the development of theories on behaviour, and it has been suggested that quantitative research methods are not appropriate for the study of human information behaviour because collecting data on things like the number of accesses of a library service or use of a journal does not provide insight into behaviour, or support the development of theories (Wilson, 1999). The original 2013 proposal for this thesis had suggested a mixed quantitative and qualitative research design. However, the literature review of information behaviour studies carried out in chapter 2 led to the realisation that existing studies were

unsatisfactory in understanding information use because they often used quantitative survey designs to count users and uses of information – just as described. This realisation, in combination with these views of other well-known researchers in the field, led the investigation to move away from quantitative methods, towards a fully qualitative design.

In addition it was found that since the 1970s there have been calls for an alternative paradigm in the study of information behaviour which “*posits information as something constructed by human beings...focuses on how people construct sense...on understanding information use in particular situations...*” (Dervin, 1986 p.16). The aim and research questions of the present research ask *how* information is used in a particular situation, that of public health work. The emphasis on the word *how* here is intended to highlight that *what* information is used is not the main focus of the research.

The present research therefore was intended to align with the call for a new paradigm. Part of this alignment was achieved through the research protocol. The view of information proposed in this paradigmatic call, as being constructed by individuals, is contrary to the epistemology associated with positivist research, which views knowledge as something that is objective and ‘true’ (Tracy, 2013). The alternative paradigm suggests an interpretive or postmodern view in its call to treat information as something that is constructed, rather than as something which exists independently of humans. The research aim and questions of the present research are interpretivist, as they are focused on understanding why and particularly how things happen from a participant point of view (Tracy, 2013) – on how information is used. Interpretivist research is associated with qualitative techniques (Pickard, 2013), and therefore in keeping with the research aims and questions of the present research, qualitative techniques are applied. Sense-making offers a way of conducting information behaviour research which understands information and the use of it in a specific way, although it does not claim to belong to a particular research paradigm. In fact, sense-making as a methodology has elements of both modern and post-modern world views (Foreman-Wernet, 2003), and can be both qualitative and quantitative (Dervin, 1983).

Sense-making is post-modern in its assertion that there is no such thing as objective, absolute information (Tracy, 2013). Sense-making suggests that information is not a 'thing', but a construction created by humans, and as such it cannot exist independently of its context, of the time and space within which it is being constructed (Dervin, 2003d).

Information and reality in sense-making are seen as being subjective and are constructed by individuals to fit their personal situation in a particular time and place. Sense-making also incorporates elements of the interpretivist paradigm. Interpretivism, like sense-making, suggests that reality does not exist as an objective truth, but is constructed through communication, interaction and practice, and states that the researcher should attempt to understand reality from the participant's perspective (Tracy, 2013).

Sense-making incorporates elements of the modern research paradigm in that it provides a framework through which a systematic approach can be taken in researching information seeking and use, despite the belief that information and reality are subjective. The systematic approach suggested consists of a set of data collection and analysis techniques including interviewing techniques and suggested codes for data analysis (Dervin, 2003g). Dervin also suggests that while it is not possible to usefully predict information behaviours using fixed characteristics of individuals such as demographic characteristics, it might be possible to predict the kinds of behaviours people engage in when seeking and using information based on the kinds of situations in which they are at the time (Dervin, 2003c). Dervin points out that research which has assumed that personal traits of information seekers and users, such as race, age or socioeconomic status can predict use has failed to detect patterns in behaviour using these characteristics as predictors (Dervin, 2003c). In contrast, there is evidence that there are relationships between personal uses for potential information (as determined by the individual situation), and the way in which individuals act to find and use the required information (Dervin, 2003c). However, sense-making differs from positivist and post-positivist approaches, which attempt to answer the question 'What is happening here?' (Tracy, 2013) as it instead seeks to understand *how* something is

happening. This is achieved by focussing on the processes of information seeking and use – how does information help, rather than what information is used or where it comes from (Dervin, 1992).

The research also makes use of Grounded Theory techniques. The form of Grounded Theory used in the present research rests on a series of assumptions. These assumptions centre on the fact that the world and human behaviour are complex and continually changing. Individuals continually create and re-create their world through interaction; individual actions carry meanings which form part of a larger system of meanings, and interactions between individuals can arise out of shared perspectives on the world (Corbin and Strauss, 2008). Grounded Theory was chosen to make-up part of the methodological approach to this research for several reasons. Firstly, Grounded Theory assumes complexity in human behaviour, and the analytical techniques described by Grounded Theory attempt to capture as much of that complexity as possible. The present research set out to address a specific aspect of human behaviour, information use behaviour. As the discussion of conceptualisations of information use and information behaviour in chapter 4 has shown, this is complex and difficult to measure. Grounded Theory was therefore chosen as a method that might be able to help capture this complexity. A second reason for choosing Grounded Theory arose from the perceived neutrality of this approach. Chapters 2 and 3 summarised the existing literature covering research utilization and information behaviour in public health. At the end of chapter 3, it was suggested that research utilization studies were more successful in capturing how public health workers use information. However, it was also pointed out that this research tended, because of its nature, to impose preconceived ideas on participants about the kind of information they should be using (chiefly academic research), and also often used a pre-existing classification of symbolic, conceptual and instrumental to group the kinds of uses participants described. It was felt that these existing studies imposed too many criteria on what counted as information and as use, from the kind of information of interest, to the way in which use was measured. As a result, it was posited

that perhaps there were instances of use, and types of information of interest to public health workers that were not really being captured by this research. A more inclusive, and open conceptualisation of information use which allowed public health workers more freedom to describe their experiences of interacting with information might, therefore, uncover new knowledge of this phenomena. Grounded Theory has been described as a technique that allows the researcher to approach understanding their participants without enforcing any preconceived ideas on those participants (Mills et al., 2006). This approach therefore seemed in keeping with and likely to support the desired openness in the research approach described above.

An additional reason for the appropriateness of Grounded Theory came from the ideas of objectivity and subjectivity with regard to information which emerged during the literature review for the present research. Chapter 3 noted that there may be an inherent assumption of the objectivity of the kind of information studied in research utilization studies. This assumption was suggested as being present partly because of the focus on types of evidence such as systematic reviews and epidemiological reports (usually seen as aiming for a high level of internal validity and objectivity), and partly because of the way in which at least some of the studies attempted to assess use - through tracing references to scientific evidence in written documents. This could mean that knowledge and understanding of the subjective way in which individuals interact with information is missing from these studies. The ideas on conceptualisation of information which emerged during chapter 4, and the ideas on the gaps in existing research utilization and information behaviour research which emerged during chapters 2 and 3 therefore both seemed to indicate the need to take a relativist approach to the research - assuming that objective reality does not exist (Mills et al., 2006). Once again, because Grounded Theory suggests that there is no one reality to discover (Strauss and Corbin, 1994), it seemed an appropriate fit with the ontological view which developed as a result of the consideration of key concepts during the literature review.

The choice of research paradigm and suitability of qualitative techniques for the present have been discussed above in general terms. The next section discusses the application of specific qualitative techniques in the area of interest to this research (information use), evaluating the relative advantages and disadvantages of each.

### **5.3 Using sense-making to investigate information use**

The main data collection technique used in sense-making is the Micro Moment Timeline Interview (MMTI) (Dervin, 1983). It is assumed that individuals are able to articulate the processes which they go through when sense-making, and are therefore able to tell their story to the interviewer (Dervin, 2003e). Sense-making interviews are generally structured in order to collect data on three things: participants' situation, the gaps in sense they experience, and their uses of information. The design of the MMTI asks participants to describe in steps a recent troublesome situation or event that they have experienced which is relevant to the research (Dervin, 1983, Dervin, 2003f). The MMTI technique encourages the participant to focus in on this situation by asking a further battery of questions about a step or steps in the event/situation. Elements of information behaviour including information needs, information seeking and information use are drawn out by asking participants what questions they had during the event (information needs), how they tried to find answers (information seeking) and how those answers, if found, helped or hindered them (information uses).

There are numerous examples of the use of the micro-moment interview technique in practice (Cheuk, 2008, Genuis, 2012). Sense-making studies typically use the first part of the interview to ask the participant to explain their situation. Examples of these initial questions include asking participants in a study of information behaviour of Australian males to give an example of a time where they had needed information to help them during a significant period of life stress (Wellstead, 2011), asking participants working in local government to describe their current situation with regard to a priority area they are focusing on in their work (Cheuk, 2008), asking participants acting as informal carers to think back

over their time as a carer and describe three events either good or bad that stood out in their mind (Harrison and Hepworth, 2003), and asking participants who were females who had experienced domestic violence to describe a single event that had been particularly significant to them in their attempts to cope with what was happening to them (Harris, 1988). These examples illustrate how sense-making can be adapted to fit different research interests.

After setting the scene and gathering some information about the participant's world and experiences the researcher can then follow up the initial question in a number of different ways. The interviewer may choose to ask the participant about each step of their experience in detail, by asking a range of interview questions (Cheuk, 2008). With these subsequent questions, the interviewer asks the participant what questions arose for them as a result of an event, whether they were answered, and what helps and hindrances the answers brought. In some cases, interviewers have added further questions appropriate to their own study. For example, in a study of knowledge management in local government, the researchers added a question asking participants to describe what their ideal scenario would be (Cheuk, 2008). A study on sense-making in carers included questions on how important it was to participants to bridge the gap they experienced, whether they had experienced these kinds of gaps in understanding on more than one occasion, whether respondents had expected that answers to their questions would help or hinder them once found, and whether answers had helped/hindered them in ways that they did not expect (Harrison and Hepworth, 2003).

The basic set of questions asked about the individual steps as defined by Dervin (Dervin, 2003g, Dervin, 1983) are as follows:

- What questions arose at this step?
- What were your thoughts and feelings?
- Did you get an answer to your question?



- If so, how did this answer help or hinder you?
- Were there any barriers in the way that made finding an answer more difficult for you?

Sense-making was first considered as a potential method for this research because of its clear conceptualisation of information use. As discussed in chapter 4, there is an array of conceptualisations of information use, some of which overlap with each other, and some of which are restricted to certain activities. Sense-making conceptualises information use as the hurts or helps which information can bring to an individual. By doing this, it avoids applying any restrictions to the way in which information is used, or the type of information used. It side-steps other conceptualisations of information use whilst at the same time embracing all of them. It does not assume that more information is always good, recognising that information may be hurtful or difficult for an individual to accept as well as potentially being helpful. It defines sense-making behaviour (information seeking and use) as being both cognitive and procedural or external (Dervin, 1983). This conceptualisation therefore fit with the aim of the research to deal with information behaviour in a holistic way, by avoiding a research design which made any value judgements about information and information use.

In terms of data collection techniques that are normally used during sense-making studies, sense-making also appeared to be a good fit as a method that would be able to draw out data on how information is used in public health, including uses which were either cognitive or tangible/observable in nature. The MMTI technique attempts to build up a detailed picture of the individual's experiences with regard to their situation, and information behaviour by asking a series of questions about that particular situation. Sense-making is focused on understanding the processes of information use, rather than what information is used. Dervin describes this focus as a process/dynamic focus comparing it to the state/entity focus which she claims is more common to traditional communication (information seeking and use)

research (Dervin, 2003b), and which has also been common to the previous research into information behaviour in public health workers.

The sample of existing studies using sense-making methods discussed above shows that sense-making is not a rigid design for data collection which mandates a specific interview design requiring the same question wording to be used in every sense-making study. These studies illustrate the flexibility of the method. Dervin states that “*sense-making posits no hypothetical questions to respondents, nor does it present elaborate lists of options to which respondents must reply*” (Dervin, 2003g). Rather than a strict formula for carrying out an interview, sense-making is a “*set of listening methods*” for conducting audience research and individual interviews (Dervin, 2003g).

### 5.3.1 Think-aloud methods and vignettes in sense-making studies

Think aloud methods have also been used in sense-making studies following Dervin’s methodology. One sense-making study of the experiences and motivations of women using information to help them make sense of their menopause transition used an in the moment elicitation technique to gather data (Genuis, 2012). This technique involved presenting participants with a series of documents relevant to dietary supplements and menopause, and asking participants to read and discuss their thoughts during the interview (Genuis, 2012). Dervin describes a similar technique as part of the pantheon of sense-making methods (Dervin, 1983). This technique, called ‘Message Q/ing interview’ is an adaptation of the traditional interviewing technique which involves asking the participant to read a passage of text and stop at each point where the text raises a question in their mind (Dervin, 1983). The questions arising are then discussed in detail with the interviewer.

Therefore it was decided that, alongside semi-structured interviews loosely based around the MMTI interview technique, data gathering for this thesis would also include a similar exercise. Initially this exercise was referred to as a think-aloud exercise, a technique similar to the in-the moment elicitation or message q/ing referred to above. However the application in the present research is in fact closer to a vignette, which is a kind of story-telling used in

qualitative research which entails giving the participant a hypothetical situation and asking them to reflect on how they would respond to that situation (Urquhart, 1999, Finch, 1987). One of the limitations of research methods which rely on participant recall, such as interviews or surveys, is that they are vulnerable to recall bias. The use of sense-making in the present study relied on participants being able to accurately recall and discuss an occasion (an event for the purposes of the MMTI) where they had struggled to carry out a work task, and the role that information had played in that event. There was a possibility that data from participants may be inaccurate or incomplete if they were not able to recall full details of the event. Adding a vignette exercise to the interview provided an opportunity to collect some real time data on the use of information by participants, although the nature of the vignette activity meant that this would only be data on the potential use of the information that the participant could perceive at the time of reading. The vignette technique is also thought to be advantageous in that a participant who is presented with a vignette can in a sense define the meaning of the vignette for themselves, and is able to respond to that situation in a more concrete way than they might to interview questions which may be more abstract in nature and lacking in the specific context which accompanies a vignette (Finch, 1987).

### 5.3.2 Sense-making assumptions

Using a sense-making methodology involves certain assumptions related to information and information use. The ways in which information and use are conceptualised form part of these assumptions (and have been discussed in chapter 4), and the more specific core assumptions of sense-making are as follows:

1. Individuals need to create their own understandings of the world, in a world where there are no absolute, objective truths. The world is constantly changing and a specific individual today is different to that same individual tomorrow. The creation of this 'sense' is a constant and evolving process for which individuals can use

information provided by others, but in which they must of necessity connect this new information with their own personal understandings of the world.

2. Use of information is not static – it is something that changes through time and space. The same information can be used differently by different people in the same time and space, or in different times and spaces, or indeed by the same person in a different time or space.

3. There are a variety of ways in which individuals can and will use information depending on their situation. Sense-making conceptualises these uses as 'hurts' and 'helps'

4. Information use can be more easily predicted by looking at the way in which the person using that information perceives their situation. Individuals in a situation that they have similar perceptions of may use information in similar ways. (Dervin, 2003e).

One of the key underlying assumptions of sense-making is that of discontinuity. It is assumed that there is discontinuity between all things in reality – between different users at any given moment in time, between the same user at different times and between different organisations at the same time (Dervin, 1992). Although sense-making does not necessarily take a postmodern stance toward the investigation of information behaviour, the assumption of discontinuity between individuals, spaces and times does have something in common with the multiple realities view of post-modernism. If we accept that there is a fundamental discontinuity or difference between any two individuals existing in the same space and time, by extension we can argue that those two individuals are experiencing their own unique realities.

## 5.4 Research protocol

### 5.4.1 Study population

The study population for this research is the public health workforce based in the UK.

According to the World Health Organization, public health professionals “*monitor and diagnose the health concerns of entire communities and promote healthy practices and behaviours to ensure that populations stay healthy*” (World Health Organization, 2014).

A recent exercise in mapping the public health workforce in England defined this workforce as consisting of “*all staff engaged in public health activities who identify public health as being the primary part of their role*” (Centre for Workforce Intelligence, 2014 p.3).

This core public health workforce is estimated to consist of 31,000 – 34,000 individuals in England (Centre for Workforce Intelligence, 2014). The Centre for Workforce Intelligence (CfWI), who were responsible for this mapping exercise list the following roles as making up this workforce (Centre for Workforce Intelligence, 2014):

- Public health consultants and specialists
- Directors of public health
- Public health academics
- Public health managers
- Public health scientists
- Intelligence and knowledge professionals
- Public health nurses
- Health visitors
- School nurses
- Public health practitioners
- Environmental health professionals

Individuals working in any of these roles, anywhere in the UK were eligible for participation in

the research. Although the CfWI mapping exercise concentrated on the public health workforce in England, the present study is not restricted to England, but potentially covered individuals working in any of the UK home nations. The breakdown of the English public health workforce is simply used here for the purposes of describing the population of individuals who were eligible for participant in this research. As the aim of the research was to understand the use of information in day to day public health work individuals had to be either in full or part time employment in a public health role in order to be eligible. Full time students, the unemployed and retired individuals were not eligible to participate.

Another option for selection of a study population for this research would have been to restrict the sample to individuals in a particular sector of the workforce, for example choosing to focus on one of the roles or sectors listed above. However, the literature review found few pieces of research relevant to public health information behaviour that have been carried out in the UK, and even less that have taken place since the transition of public health responsibility from the NHS to Local Authorities in 2013. This means that there has been little research into information behaviour in public health within the public health system in its current incarnation. Therefore, at the time at which the methodology for this research was planned (2014/15) there was no reason to target any one particular sector of the public health workforce over any other. If one or several sectors or roles had been the focus of previous sense-making studies, this would have highlighted an obvious need for studies on the remaining sectors or roles. However, this was not the case. In addition, the public health workforce operates in a collaborative way, meaning that individual workers often have contacts and common interests with individuals from other sectors and roles. Public health is a policy oriented field (Smith, 2013), with a common goal of influencing policies towards having a positive impact on population health. It has been theorised that networks are important in struggles to achieve public health goals. This is suggested by Sabatier and Jenkins-Smith's Advocacy Coalition Framework (ACF) (Sabatier and Jenkins-Smith, 1993). The ACF suggests that networks engaged in public health activities are composed of diverse

types of actors and can include policy makers, researchers, think tanks, interest groups and others. Viewed through an ACF lens, public health can be seen as a cross-sectoral enterprise, where individuals from different types of organisation and role work together in direct contact with each other to achieve common goals. Bearing this in mind, it was thought appropriate that for this sense-making study of public health workforce information behaviour in the UK, individuals from all sectors and roles in public health should be eligible to participate. Further to this, given that a snowballing strategy was used to extend the sample beyond the initial convenience sample, it was felt that it would be better not to place any limits on the kinds of individuals that participants were able to suggest for inclusion in the research, at the risk of leaving out potentially information rich cases.

#### 5.4.2 Sampling

The study sample was seeded using a small convenience sample of individuals working in public health, who were already known to the researcher at the start of the research.

Convenience sampling can result in a biased sample (Gorman, 2005). To reduce the possibility of bias and broaden the sample, a snowballing approach was used. Snowball sampling can be a helpful technique to reach hidden, elite or powerful populations (Atkinson and Flint, 2004). Given the networked nature of public health and the fact that the desired population for this thesis were busy professionals who may be unwilling to give up their time to be interviewed by an unknown researcher, it was thought that snowballing might be helpful in identifying contacts which would otherwise have remained unknown, or would be more likely to agree to interview. In this thesis snowballing involved asking individuals from the convenience sample to suggest the names of colleagues that they thought would be interested in participating in the research, or would be able to provide particularly rich or interesting perspectives on the use of information in public health. Snowball sampling is the most common technique for identifying a sample, and is a recognised method of reducing the bias inherent in convenience sampling (Pickard, 2013). However, it is important to acknowledge the biases present in snowball sampling as a potential limitation on this

research. It has been suggested that snowball or chain referral sampling is biased in its own way because it leads to the selection of individuals who are all members of the same social network (Browne, 2005, Biernacki and Waldorf, 1981). This may mean that the sample used in the present research is restricted to a group with similar world views and professional roles in public health, and this should be considered when interpreting the results of the thesis, presented in chapters 7 and 8.

Following snowballing of the initial convenience sample, a total of fourteen participants were eventually interviewed. Sampling sizes in qualitative research are often understood to be determined through saturation. The attainment of saturation point during the analysis of data is thought to indicate that enough data has been collected, and that sampling can be terminated (Saunders et al., 2018). Saturation in Grounded Theory research has been defined as "*the point in coding when you find no new instances of codes in the data. There are mounting instances of the same codes, but no new ones*" (Urquhart, 2013c). However, in other cases, emphasis in defining saturation in Grounded Theory differs, and is understood to have occurred when a theory of behaviour has been developed, and there is judged to be sufficient data to illustrate that theory (Starks and Brown Trinidad, 2007). It is argued that this research met both of these criteria. In open coding, the final code to be introduced was defined during analysis of data from participant 9. Following this interview, no further new open codes were identified. A table of open codes illustrating this is provided in appendix 2. As a workable theory was then developed through selective and theoretical coding (which will be explained in chapters 7 and 8), this demonstrates the attainment of theoretical saturation by the second measure described above. Data for the various selective and theoretical codes is provided and discussed throughout chapters 7 and 8, and tables illustrating the selective and theoretical codes are provided in the appendix 3 and 4. While it is argued that saturation has been achieved in this thesis, it is nevertheless true that the data on which the thesis is based comes from a small sample of 14 participants. No claims are made about the wider generalisability of the findings presented in chapters 7 and 8, and this



is partly because of the small sample size. The findings presented in this research include a substantive theory of sense-making in public health, but this should be interpreted as presenting one possible theory of sense-making and not as a definitive theory which can be assumed to apply across public health workers in the UK.

#### 5.4.3 Interview procedure

As already mentioned above, the core data collection technique of the sense-making approach is the micro-moment timeline interview (MMTI) technique. The basic MMTI involves the researcher giving the participant a set of fairly loose criteria within which they are asked to describe a situation that they have faced as a sequence of steps or events – the participant is able to recall the events in any order they please (Dervin, 2003e). Micro-moment time line interviews can be a fairly lengthy process, as the ‘full’ version of the technique involves asking participants a battery of further questions about each stage of the event that they have described (Dervin, 2003e). This process is referred to by Dervin as triangulating, and involves extracting sense-making elements to a situation (questions that arose for the participants, their thoughts and feelings), and then for each of these elements, asking what led to any questions experienced, how it relates to the participant’s life, whether the questions were answered etc. (Dervin and Frenette, 2003). Sense-making interviews are known to take longer than other kinds of interviews (e.g. up to 2 hours) (Dervin, 2003a). As the present research is concerned with the behaviour of busy professionals, it was thought appropriate to use an abbreviated form of the micro-moment time-line interview in order to avoid taking up too much of participants’ time, and to ensure that potential participants were not put off from taking part in the research by hearing that participation would involve a lengthy interview.

This abbreviated micro-moment timeline involved asking participants to describe a recent situation they had faced at work which related to improving public health, and where they had struggled to achieve what they wanted to. Participants were then invited to select a

stage to discuss further. This stage then became the focus of the remainder of the interview, with all subsequent questions focusing on that stage.

Although a protocol setting out interview questions and prompts was used for each interview, the interviews were treated as guided conversations rather than following a rigid structure. As a result, the full set of questions asked during each interview, and the order in which those questions were asked varied between interviews. Some interviewees gave enough information to cover salient points without the need for all questions to be asked. In other cases participants made observations where their full meaning was not clear to the researcher and they were prompted for clarification. A copy of the interview guide is provided in appendix 5. The interview guide was structured in three parts, asking participants to describe a situation that they had faced, the gaps in information or understanding experienced in that situation, and the uses or helpfulness of the information that they had found whilst moving through the situation. Each of the three parts, situation, gaps and uses was represented in the interview guide by a core, starter question, used to get the participant to begin talking about these aspects of their experiences. The lynchpin of the interview structure was to ask participants to describe a recent situation that they had faced at work.

Interviews also included a vignette exercise where participants were presented with a selection of short written pieces, all of which were printed copies of BBC News articles on a range of public health topics. Participants were invited to choose any of the articles and read through it whilst verbalising any thoughts that occurred to them out loud. The guide for the vignette/think aloud exercise is available in appendix 6.

## **5.5 Application of Grounded Theory to this research**

Grounded theory methods are known for their application in developing theories about behaviour (Corbin and Strauss, 2008). While sense-making has been used to inform the conceptualisation of information use, and the methods used to collect data on this,

Grounded Theory has been used to guide the underlying approach to analysis and theory building.

#### 5.5.1 Literature review

Section 5.2 discussed the use of Grounded Theory methods during this research. It was argued that Grounded Theory was appropriate in part because the research seeks to avoid imposing any preconceived ideas on participants, and Grounded Theory uses methodological approaches which also attempt to avoid this. The openness of this approach has been taken by some to mean that those attempting to carry out Grounded Theory research should avoid undertaking any literature review prior to data collection (Urquhart, 2007). It will not have escaped notice that in the present research, a literature review covering what was thought to be the conceptual background to the research as well as existing primary research on the topic at hand was carried prior to development of the research protocol. The place of the literature review in Grounded Theory is discussed at the beginning of chapter 2. For the present research, a literature review was necessary despite some controversy over whether the findings of such a review can result in the researcher inadvertently introducing concepts identified through the literature review into the analysis of new data. However, it is argued that the researcher's pre-existing knowledge and experience is in fact a valuable research tool which, together with other relevant literature should be drawn on throughout the analysis process (Strauss and Corbin, 1998). Therefore, the fact that a literature review has been carried out in this instance should not be seen as a barrier to the subsequent use of Grounded Theory, but as something that may help to benefit the analysis.

#### 5.5.2 Grounded Theory, research paradigm and the role of the researcher

As set out in section 5.2 of this chapter, the thesis approached the task of researching information use from an interpretivist stance. The choice of paradigm has some implications for the application of Grounded Theory. There has been an ongoing debate about the differences between the two main schools of Grounded Theory, the Glaserian approach and

the Straussian approach. Choice of research paradigm and role of the researcher in analysing data is an important area of difference that is relevant here. This is especially important due to the need to articulate the role of the researcher in handling and analysing data collected through qualitative means such as the semi-structured interviews used in this thesis. It has been suggested that Glaserian Grounded Theory approaches research from a more objective, positivist paradigm, while Straussian Grounded Theory takes an interpretivist stance (Rieger, 2019, Howard-Payne, 2016, Urquhart, 2013c). Where this distinction is made, the interpretivist stance of the present thesis would necessitate the use of Straussian Grounded Theory in order to match the chosen paradigm. Further to this, the present thesis exhibits the additional Straussian characteristic of having broad research questions that were developed before the start of data collection, and were used to inform the questions asked during interviews (Rieger, 2019). Straussian Grounded Theory acknowledges and expects that the researcher will be subjectively positioned toward their data, as they collect, analyse and interrogate it (Howard-Payne, 2016). The researcher is seen as having an interpretivist role, using their pre-existing experience and knowledge to help them in the construction of meaning from the data (Rieger, 2019). As such, it is acknowledged that some critical reflection on the part of the researcher, about their role in the research, should be included in the write up of Straussian Grounded Theory research.

In the present thesis, all data collection and analysis were carried out by the same single researcher who had several years' experience of working in a research and information team within a small non-profit public health organisation prior to commencing the research. As the PhD study which produced this thesis was engaged in part-time, the researcher continued to work full time for that same public health organisation throughout the first 3 years of the thesis. This fact, and the fact that the researcher had been involved in some research into information behaviour in public health previously (see Ford and Korjonen (2012)) have affected the interpretation of the research data. A history of working with health information, including both public health and clinical information meant that the researcher was already

aware of the concept of evidence based medicine and evidence based public health, and also possessed a greater awareness of the workings of public health policy and practice than someone new to the topic might be expected to have. This meant that there was a knowledge base of public health and evidence based practice which was drawn on during the analysis of data. The use of this knowledge base may have had both advantages and disadvantages in the research. It may have resulted in a greater focus on describing some of the tensions around use of evidence in public health, including the fact that while RCTs are sometimes seen as a preferred form of research, they are often not available for public health topics. As a result, these topics may have received a level of emphasis in the analysis which might not have been present had the research been conducted by someone without a pre-existing knowledge of evidence based public health. However, the researcher's pre-existing knowledge has also been advantageous in providing greater sensitivity towards the topic of evidence based public health and some of the problems related to it, as well as a greater understanding of the kind of work tasks and situations described by interviewees. With a Straussian approach to Grounded Theory, the previous knowledge and experience of a researcher, whilst being acknowledged to affect interpretation of data, is also seen as advantageous because it improves theoretical sensitivity (Corbin and Strauss, 2008).

### 5.5.3 Coding, memoing and data analysis

Coding for this thesis consisted of 3 stages: open, selective and theoretical. A variety of coding approaches exist, each of which is associated with a different school of thought in Grounded Theory. Glaserian Grounded Theory uses stages of open, selective and theoretical coding. In Straussian Grounded Theory, the coding paradigm is less well defined. Strauss and Corbin's book, 'Basics of Qualitative Research' (Corbin and Strauss, 2008) is the definitive guide to applying their approach to Grounded Theory. However, the approach to coding suggested in this book has altered over the course of several editions (Urquhart, 2013c). Early editions described stages of open, axial and theoretical coding while in later editions the emphasis is no longer on using specific tools or stages of coding (Urquhart,

2013c) and is instead on using a broader set of tools including coding for process and using a condition and causal matrix (Corbin and Strauss, 2008).

The coding stages applied in the present research are often associated with Glaserian Grounded Theory – for example, in a handbook for Grounded Theory authored by Cathy Urquhart, the author describes their approach as tending toward Glaserian, and presents the coding approach as open, selective and theoretical (Urquhart, 2013c). Therefore the decision to work through stages of open, selective and theoretical coding in the present research may initially seem at odds with other elements of the approach which are Straussian, such as the development of research questions prior to interview and the interpretivist paradigm. However, these ideas about the philosophy and approach to Grounded Theory are not as cut and dried as may appear. Wider reading of Grounded Theory literature reveals that while some associate Glaserian Grounded Theory exclusively with a positivist paradigm and objective stance, others convincingly argue that Grounded Theory is a neutral method which was never intended by Glaser to be seen as exclusively positivist (Urquhart and Fernández, 2013). On this basis, it seems reasonable to make use of the Glaserian approach to coding stages to advance the analysis, especially as later writings of Strauss and Corbin do not mandate adherence to specific coding stages, and instead encourage a flexible approach to analysis (Urquhart, 2013c, Corbin and Strauss, 2008).

Full details of the way in which each coding stage was conducted, including criteria that determined why certain quotations were brought together into a single code are provided in chapters 7 and 8, which present the results of the analysis. However, a brief description is given here in order to provide an overview of the research methods, and for ease of reference for the reader.

Coding proceeded in parallel with interviews, and the first stage of coding (open coding) began as soon as the transcript from the first interview had been approved by the participant. Open coding in Grounded Theory consists of line by line coding, where the

researcher assigns words as labels to organise sections of text (Urquhart, 2013b). In the present research, as appropriate for Grounded Theory, these code labels were drawn from the data rather than being suggested by any existing coding structures or terms suggested by pre-existing literature.

To begin with, Atlas.ti software was used to manage and keep track of the coding and memo-ing process, by attaching codes to sections of transcripts marked as quotations in Atlas.ti. However, due to difficulties with the software as a result of software updates made to Atlas during the course of the thesis, use of this software was eventually abandoned in favour of a more straightforward approach. This approach used an Excel spread sheet to record quotations with a separate column recording the open codes for each quotation.

Quotations were accompanied by memos (this section provides a brief description of the memo-ing process, but see chapter 7 for further detail). Throughout the generation of these open codes, additional literature was referred to, in order to help develop a more conceptual understanding of the data. As specific concepts were identified as being of potential relevance these were researched through existing literature, for example literature on the conceptualisation of evidence, authority, experts and expertise was consulted. As codes developed, the interview data related to each code was copied and pasted into Word documents. These Word documents helped to review quotations associated with each code to determine whether any quotations needed to be removed and assigned elsewhere, if two codes could be merged or if the data within a single code could be split off into its own separate codes. Examples of these Word documents and code books are provided in chapter 7.

Once open coding had been completed, the analysis moved onto what is sometimes referred to as selective coding. Selective coding involves organising the open codes into categories or themes (Urquhart, 2013b). The same process of tracking quotations that were identified as contributing to a certain selective code using Excel and Word was followed. Selective coding was iterative, involving some grouping and re-grouping before a

satisfactory arrangement of codes was reached. Again, further details on this process are provided in chapter 7.

The third and final stage of coding was theoretical coding, which involves the development of relationships between existing selective and open codes, creating a theory which seems to explain the full pattern of behaviour identified (Urquhart, 2013a, Urquhart, 2013b). This stage also involved the identification of a core category. The choice of core category and outcome of theoretical coding are explained in detail in chapter 8, which also presents the substantive theory developed as a result of this process.

Throughout the three stages of coding conducted, memos were generated to record developing ideas about open codes, and then later concepts and the relationships between them. Grounded Theory memos are used to store the researcher's thoughts during analysis (Corbin and Strauss, 2008). These memos often included references to the pre-existing literature that had been used to help develop concepts. Memos for individual codes were stored in the Word documents which contained the copied and pasted quotations for that code. Separate, longer memos focusing on different concepts identified in the research were also created, and much of the text of these memos eventually went into the write-up of the research findings provided in chapters 7 and 8.

Another aid to developing the codes and substantive theory presented in this research were diagrams, similar to brain storming diagrams. Diagrams in Grounded Theory are "*visual devices that depict relationships between analytic concepts*" (Corbin and Strauss, 2008p. 117). In later stages of coding, diagrams became helpful in attempts to define links between different codes. Early efforts at diagramming for instance included a handful of codes that there seemed to be a relationship between, with arrows and annotations to show and explain relationships. In some cases diagrams were useful in discerning clusters of codes that seemed to be connected to participants efforts to cope with a particular aspect of a situation e.g. uncertainty about what the best information might be, or aims in using information or evidence. The final substantive theory developed at the completion of coding is presented in



chapter 8 as an integrative diagram. Integrative diagrams are an important tool for theory development, and are used in Grounded Theory to guide the researcher to think about the relationships between the codes, categories and concepts together, capturing this through the aid of the diagramming process and supporting notes and memos (Urquhart, 2013a).

## **5.6 Ethical issues**

Ethical approval for the study was obtained from the UCL ethics board prior to data collection. The study was based entirely in the UK. Research best practices of informed consent were adhered to throughout. All participants were required to read an information sheet explaining the aims of the study, its design and how the data collected would be used before deciding whether or not to take part. Those individuals who were happy to take part were then asked to sign a consent form (see appendix 7). The consent form provided participants with a number of choices with regard to shaping their participation in the research. This included giving participants a choice in whether or not their interview session was recorded or not, and whether they wanted to be informed of any presentations or publications produced as a result of the research. All participants were debriefed following their interviews. Once notes and/or a transcript based on the interview session had been prepared, this was sent to the participant, asking them to make any additions or amendments that they wished to before the data was analysed.

The main ethical issues related to the study were in protecting the confidentiality of participants' identities. As participants in the study were all professionals working in public health, and were giving their professional time in order to discuss the way in which they work, it was deemed appropriate to give participants the option of having their comments attributed to them by name in publications of the results of the research. Alternatively, participants could choose to keep their identity confidential in all publications.

For those wishing to keep their identity confidential, there was a small risk that data from published, anonymised comments reproduced in publications of the research would identify

them to a third party. Every effort was made to protect identities, by ensuring that details such as specific places or work programmes etc. mentioned by participants during interviews were removed from participant quotations reproduced in the final thesis.

## **5.7 Limitations**

There are several limitations to using an approach inspired by sense-making to conduct the research. Sense-making interviews are known to be time-consuming, with Dervin advising that they can take up to 2 hours (Dervin, 2003a). Due to the nature of the interviewees, it seemed inadvisable at the outset of the research to approach individuals by asking for a 2 hour interview, as this may preclude or at least put off some potential participants. The desire to incorporate the vignette exercise into the interview time also meant an additional pressure on the time available for interview. Due to the limited time available to conduct the interviews, it was not possible to conduct a full micro-moment time-line style interview. As discussed earlier in this chapter, this would involve asking a battery of questions to analyse different aspects of an individual's situation. In order to make the interview manageable in the time available, it was necessary to select one aspect of the situation described by each participant, and attempt to further analyse this. As a result, this may have limited the data collected by interviews, as it means that some aspects of the situations described were left unexplored.

Another disadvantage of the use of the sense-making technique proved to be neutrality of the method. The micro-moment time-line interview is described as having a "neutral" structure, with the purpose of allowing participants to describe their own worlds in their own terms (Dervin, 2003f). In the present research, this neutrality was translated into an initial interview question which asked the participant to choose and describe a situation that they had recently faced in their workplace. There were no criteria given to the participant to guide their choice, in order to try and leave each participant free to talk about whatever they wanted to. As a result, some participants did initially struggle to select a situation, asking several questions at the start of the interview to try to elicit guidance from the researcher on

what kind of situation they should choose. As far as possible participants were reassured in a neutral and open (so as to avoid their inadvertently being led by the researchers) way that they could pick any situation where they had needed to complete a task or solve a problem, or had a question which they needed to answer. This was usually enough to get the participant started on describing a situation.

Following on from this limitation, the very neutrality and openness of the interviews and the lack of criteria for participants in choosing a situation to describe meant that the kinds of situations discussed in interviews varied quite widely. On the one hand this could be seen as a positive as it provides a broad cross section of the kinds of situations encountered by public health workers. On the other hand, the variation in situations did at times make data analysis a challenge, resulting in a high number of codes initially as an attempt was made to grapple with and incorporate this variety into a coherent analysis.

## **5.8 Conclusion**

This chapter provides an overview of the research process, from the way in which sampling was conducted through to the data coding and analysis. The mechanics of the coding process have been described, including the three stages of open, selective and theoretical coding. However, part of the explanation and detail of the methodology of this research can only truly be described through the descriptions of the open, selective and theoretical codes which were developed - what those codes were, what their conceptual meanings were, and what criteria were used to create a code and determine whether a quotation belonged with that code. These decisions are best explained as part of the presentation of the results, and consequently the full detail of the methodology is made apparent through chapter 7 and 8 which present the outcome of the coding process. As a further introduction and context to the experiences of participants which the codes and eventually the theory developed represent, chapter 6 provides a summary about the participants. This summary presents an overview of the kinds of situations encountered by the participants, as well as some

background information to public health work in general, and the kind of work which these participants were involved in.

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## **6 The participants**

### **6.1 Introduction**

This chapter presents an overview of the participants who contributed interview data to this research. This information is intended to form a precursor to the coding and of this data, which is described in chapters 7 and 8. The purpose of the present chapter is to provide a more descriptive, narrative overview of the experiences which participants narrated, in order to allow the reader to develop some general or background understanding of the participants and the kind of work in which they were engaged.

### **6.2 About the participants**

A total of 14 participants were interviewed. Nine of the participants worked in non-profit public health organisations, four in research/academic organisations (i.e. Universities), and two had involvement in several different types of organisation, e.g. national organisations, local healthcare or non-profit organisations. Table 6-1 provides a break down of the participant group against the categories of public health worker listed in chapter 5 to allow readers to determine how the sample used in this thesis compares to the broader spectrum of public health roles identified by analyses of the public health workforce conducted in the UK (see Centre for Workforce Intelligence (2014)). A breakdown of broad geographical locations of interviewees is also provided for additional context (see table 6-2).



**Table 6-1: Break down of participants against the categories of public health worker identified by the Centre for Workforce Intelligence.**

<b>Public health role</b>	<b>Number of participants from this group</b>
Public health specialists	10
Directors of public health	0
Public health academics	3
Public health managers	0
Public health scientists	0
Intelligence and knowledge professionals	1
Public health nurses	0
Health visitors	0
School nurses	0
Public health practitioners	0
Environmental health professionals	0

**Table 6-2: Geographical breakdown showing broad location of interview participants**

<b>Geographical location within UK</b>	<b>Number of participants from this group</b>
London and South East	11
North East	1
East of England	2

Table 6-1 highlights some of the challenges around identifying what constitutes the public health workforce in the UK. The majority of interviewees have been grouped as public health specialists, however this seems to be a broadly defined role. The participants placed in this group in table 6-1 were all employed by non-profit/third sector organisations. According to the situations described during their interviews, it appears that their roles could best be understood as those of specialists, because such roles deal with complex public health issues. Public health specialists have been described as working on the planning and delivery of policies at local, regional or national levels, including provision of evidence-based advice (NHS, Undated-b). It is acknowledged that Specialists may work in voluntary or third sector

organisations, and that public health roles in these organisations include advocacy and research (NHS, Undated-a). The specialist role therefore seems to be the best fit for the majority of participants in this research, although the difficulty in mapping individual participants to specific roles set out within the CfWI report is acknowledged. According to the situations which they described during interview, it appears that these participants were involved in research or advocacy tasks such as gathering data from populations affected by public health issues, providing information for, or working on the development of public health relevant guidance or publications, carrying out work related to advocacy or information provision to support policy development, or carrying out work advocating for local health service provision. These individuals provided examples of tasks and situations relevant to public health topics such as alcohol control, obesity, health inequalities or dementia.

The difficulty in mapping each participant to a specific public health role is partly due to the complexity of some of the roles of participants in this research, for example the sample included a participant with a doctoral qualification in public health who has not been classed as a public health academic in the table above, because that individual worked for a non-profit public health organisation. In another case, a participant although employed by an academic organisation, was engaged in a role which appeared to fit better within the category of knowledge and intelligence. The majority of participants were employed by various non-profit organisations based in and around London and the South East, and were engaged in work relevant to public health policy. The role of local and national non-profit organisations in advocacy in a range of domains including public health is recognised and has been the subject of academic research (Chin, 2017, Vernick, 1999). The sample therefore consists of a relatively narrow scope of individual roles within public health, as can be seen from the mapping to categories proposed by the Centre for Workforce Intelligence (CfWI). It is therefore a limitation for this thesis is that the interview sample is not fully representative of the range of public health roles as identified by the CfWI. It is

acknowledged that unrepresented roles such as environmental health practitioners or health visitors working in communities for example may face quite different situations to those narrated by the participants in this research, and therefore the data gathered here should not be taken to represent all of these workforce groups.

The employing organisations of the participants from non-profit organisations included large and small charities with interests in specific areas relevant to public health e.g. particular diseases, conditions or aspects of population socioeconomics that are known to affect public health. These kinds of non-profit organisations are sometimes referred to as third sector organisations. It is important to draw a distinction in any discussion of the Third Sector between non-profit and voluntary work. The term 'voluntary' in reference to voluntary work or the voluntary sector implies that individuals working in this area are doing so unpaid, providing their time and skills for free. There are however many roles in the Third or non-profit sector which are paid – all of the participants from the Third or non-profit sector who were interviewed during this study were in paid employment, but for organisations whose primary aim is not to make a profit from their activities. The Third Sector is defined as *“the part of an economy or society comprising non-governmental and non-profit-making organizations or associations, including charities, voluntary and community groups, cooperatives etc.”* (Oxford English Dictionary, 2018). Third Sector organisations sometimes engage in attempts to shape policy and strategy, as well as being involved in front-line service delivery (Association of Chief Executives of Voluntary Organisations, 2010). The participants from non-profit organisations often (but not always) described activities which appeared to have a policy-advocacy element to them, or sometimes spoke in terms of persuading or influencing others at different times during their interviews, indicating that they were engaged in these kinds of activities. For some of the tasks described it was clear that these tasks were intended to contribute directly to these kinds of efforts.

Participants from research/academic organisations were employed at UK Universities. The kinds of tasks described here were consequently often (but again, not always) research

oriented, or relating to the reporting and communication of research e.g. through journal articles or through meeting and discussion. One participant from a research setting choose to describe a more administrative task, as a way of illustrating the different kinds of roles and activities that individuals working in this setting in public health can be involved in.

### **6.3 Variety of situations**

A wide range of activities were described by participants, including writing journal articles, developing recommendations, attempting to update policy briefs and finding expert speakers to come and impart knowledge to assist with this. Some participants were involved in group work with internal and external colleagues, but some of the tasks described were self-motivated, for no purpose other than curiosity and perhaps a desire for knowledge and accountability. Some participants described looking at examples of documents to find out what would be 'good practice' for presenting information in a certain way or to a certain audience. They set up seminars and focus groups to gather new information or stimulate discussion about things they had been working on. Some talked about simple fact-finding tasks while others discussed finding and synthesising data from multiple sources in order to present persuasive messages to others.

Participants at times had to think about how best to present information to others, and the different situations featured a range of audiences which the participants had in mind. One participant described a task that focused on presenting research information to the general public, and what was the best way to do that (participant 9). Others narrated tasks where the end goal seemed to be about presenting information to policy makers, or people in positions to make decisions affecting public health (participant 4, 6, 14). One participant had to think about how to present information that could be read by a broad professional audience through the medium of a journal article, and was concerned with making the article seem relevant to this broad audience without losing content that might be useful to individuals working in a much more specific setting.

Concern with the type of information that participants had to use, or should try and look for also seemed to be a feature that cut across the situations described by these individuals, despite the variety of situations described. Authority or authoritative information was thought about, 'experts' were mentioned as sources of information in more than one interview. Sometimes specific types of information such as systematic reviews were mentioned. A summary of the main situation or task which each participant chose to describe during interview is provided in table 6-3 below.

### 6-3: Summary of situations described by each participant during interview

Participant 1	Described looking for information to back up a suggestion made to colleagues in another organisation, that a particular health condition should be listed as one possible harmful health outcome of populations engaging in certain health behaviours. The participant had proposed a particular health harm as something that should be considered in recommendations relevant to a particular issue area of public health, and was attempting to find information or data to support this argument.
Participant 2	Participant two had been tasked with locating records of activities which are thought to impact on public health work. The task involved gathering and recording documentary evidence of who was engaged in these activities. One purpose of gathering this information was to provide a rationale for carrying out further investigations.
Participant 3	Described approaching the write up of a research project as an article to be submitted for publication in a peer reviewed journal. This task involved drafting an introduction, part of which entailed what the participant referred to as "gathering evidence" to be referenced in the article. The participant briefly described the kinds of information sources they consulted for this process and also discussed the challenges of writing and producing evidence that would be of interest to multiple audiences within public health.
Participant 4	Described a process of updating a set of what they referred to as policy asks. These policy asks were measures which the organisation that the participant worked for advocated as policies which, if implemented, would have positive impacts both on population health and other areas of public concern. The participant described how they undertook to gather information to re-fresh these policy asks, and how this information was mobilised to help form a group agreement within the various members of the organisation that the participant worked for.
Participant 5	Described an administrative task related to deciding what mark to award a student for their research project. This task involved a degree of uncertainty for the participant and their fellow marker. This uncertainty particularly related to the consequences of the marking decision for the student. The participant mentioned perceiving a need to be justified in any decisions made. They also described consulting with a colleague within their department in order to understand the implications that marking decisions would have for the student.
Participant 6	Described a task carried out as part of an external group in which they participated on behalf of their organisation, alongside colleagues from a range of other organisations with public health interests. They were asked by the group to find some examples of public health documents that had been created by other organisations. The documents were to be used as examples to help identify what made a good report, and therefore what elements should be included in their own work. In describing this task, the participant emphasised the usefulness of documents and reports that made explicit evidence-based policy recommendations.

Participant 7	Described being asked to find more information about the existence of a public health interest group with a particular way of working. The participant was a member of a public health interest group that was exploring the possibility of a similar new way of working. This task involved tracking down information on what other public health actors were doing, who might already be involved in this kind of work, and when this was confirmed, finding out about their experiences.
Participant 8	Described work which they had undertaken to affect public health in their local area. Current health and public health provision in that area was under the possibility of some changes in the near future. The participant was attempting to communicate with other actors who might have decision making power over any future changes to try and present a case for maintaining certain health and public health activities in their current state.
Participant 9	Described their work in translating knowledge into practice, in particular focusing on presenting findings of public health research to varied audiences. Because the participant felt that talking about a specific instance of this work might result in the interview becoming bogged down in detail, the focus was more generally on how the participant approached the process of developing communications about public health research. They described how they undertook initial research into the background of developing communications and presentations of information, including finding out about theories of how users engage with these communications as well as the technicalities of creating them.
Participant 10	Described the process of working with a colleague from outside their organisation to plan and deliver an event. The event was held as part of a larger conference attended by a range of organisations whose work would potentially impact on public health. The event was intended to encourage organisations to reflect on their work, and included advice and guidance on how they might go about this. The participant talked briefly about the mechanics and running of the event, including what it was like working with a colleague to put it together. They also mentioned the background information which had helped to inform the content of the event.
Participant 11	Described organising a workshop for individuals who had participated in a research study that they had carried out. The purpose of the workshop was partly in order to give participants an opportunity to join in co-analysing and interpretation of the data which they had contributed, and also partly as a forum for checking that the researchers interpretation of the data rang true for the participants.
Participant 12	Described how they had gathered information on the health-related experiences of specific population groups. Finding out about these experiences helped to build on what the participant referred to as anecdotal evidence on health inequalities experienced. The participant also described how this meeting led on to the development of other projects to establish an evidence base on what was happening in this area and consider what might be done about it.
Participant 13	Described their experience of working on the development of recommendations for public health. This included participating in development of guidelines as part of a group. The participant spoke generally about how this process

	involving finding and reviewing evidence as a group, making recommendations on that evidence and the need to provide audit trails of evidence for any recommendations made.
Participant 14	Described undertaking to develop projections for future health harms that would occur to a particular segment of the population if trends in health indicators and behaviours were to continue on their present course. This mainly involved working with quantitative data sources from different organisations and then synthesising this data to create the projections. The participant described this as an exercise in headline grabbing to highlight the existence of a problem that needed urgent action.



## 6.4 Looking for information

Many of the situations described by participants contained an element of looking for information. Within this broad heading there was a fair amount of variation in the activities which the participants described. Participants 1, 3 and 14 described looking for what could be thought of as discrete, factual information – i.e. a specific answer to a specific question. All three were seeking some information, or perhaps more accurately data, on the prevalence or trends of certain diseases or risk factors for diseases. Other participants sought information of a different nature. Participant 2 for example was attempting to trace the activities of certain organisations. This seemed to involve retrieving and studying several different documents or pieces of information in order to piece records of activities together. This involved a combination of discrete, self-contained information such as the fact that organisation X was a member of another body, but also included looking at longer documents such as consultation responses (which presumably set out the organisations activities, arguments or beliefs about an issue). For other participants the search for information seemed to be more general. Participant 4, for instance set out to obtain new knowledge or update their existing knowledge on a topic. Participant 4 did not set out to discover specific facts, but instead was attempting to develop an overview-type or background on the topic. Other types of information sought included rule-based or administrative information (participant 5), example documents as a reference point for good practice (participant 6 and participant 9) and what could be thought of as intelligence information on the activities of other groups or organisations (participant 2 and participant 7).

Motivations for these activities varied. Although in some cases the activities narrated seemed to be purely self-motivated (participant 1), the majority of the time, these activities were being carried out to contribute to a larger purpose. For most of the participants who discussed situations where they were actively searching for information that they believed already existed, the motivation seemed to have arisen at least in part from an awareness of wanting or needing to contribute to some project or activity involving colleagues. In several

cases (participants 2, 5, 6 and 7) it was clear that that task had been delegated to them or requested by a colleague or colleagues.

Methods employed by participants also varied. Some participants seemed to begin their task of looking for information with a fairly clear idea of where they might find it – whether this was based on their own pre-existing knowledge and experience or on the suggestions of colleagues. Others seemed to have a more unplanned approach. Direction of searching activities could also change and evolve as the activity progressed. For instance participant 4 began by doing some relevant reading on the topic at hand, but then decided that rather than attempting to become a topic expert on the area themselves, the best approach would be to find an individual who was already an expert and get them to come and impart their knowledge to a group. At this point the participant seems to have switched from looking for actual topic information to looking for an appropriate expert whom they could invite to give a presentation.

One of the first things that became apparent when considering the picture presented by this varied group of tasks was that there seemed to be some variation in the level of structure underlying the approaches to tasks, especially where participants were actively looking for information. Some of the tasks seemed to be quite well structured, while others were not. For instance, participant 2 described a task that they had carried out in order to contribute toward a larger group project. It appears that the participant had been delegated a task as part of this group, and had also been given a start on the task by being given some pointers or suggestions on where to look for that information. The participant also mentioned what sounded like a fairly structured approach to documenting what they had found, using an Excel spread sheet. In contrast the task described by participant 1 seemed much more open, and less directed. Both participants were engaged in 'information seeking' type tasks. Participant 1 was looking for information on the prevalence of a disease/condition. Participant 2 was looking for information on the types of organisations involved in public health activities.

The level of structure seen in participant 2's approach, which began with a list of places to go to, to look for the relevant information was not seen in participant 1's task. Participant 1's task could be described as self-directed browsing of the internet, with general searching and a degree of serendipitous discovery of information. For instance participant 1 mentioned that at one point during their search, they had come across some information that mentioned the US government health body the Center for Disease Control (CDC). This had led them on to look more directly for further information produced by that organisation. Another example of a fairly structured task was given by participant 3. In this case the participant was writing a journal article reporting on a piece of primary research that they had carried out. The specific aspects of this process which the participant narrated included looking for information to support points made in the article, and to highlight the relevance of the research to different audiences. Again, the approach used had some degree of structure to it. Participant 3 did not mention having been directed to sources of information by other colleagues, and the actual task of writing the paper seems to have been carried out as a solo task, at least in the drafting stage related by the participant during the interview. The participant's searching activities were structured in the sense that they were directed, albeit self-directed, in that the participant seems to have begun the information seeking aspect of the task by already having a clear idea of where to go to find the necessary information. There were some similarities between participant 1 and 3, in terms of the kind of information sought. Both participants wanted to find statistical information about the prevalence of a certain public health problem, and in both interviews there was an intimation made by the participants, at different stages of the task, on the best source for that information. The difference was that participant 3 seemed already to have the idea of a best source for information in their mind before they began the search, whilst for participant one this idea was something that occurred to them part way through.

There were also differences in terms of motivations for tasks between the different participants. One example of such a difference is seen by comparing participant 1 and

participant 2. Participant 1's task was self-decided and self-motivated. It seemed to be something that began as a result of their own curiosity and desire for accountability. Participant 2's task on the other hand was given to them by a colleague and was linked to a larger project – it was therefore part of a team effort.

Unsurprisingly there were several references to Google or general internet searching. Colleagues as a source of information were also mentioned in several interviews, and in some cases, specifically colleagues who were thought of as experts. Having said this, the interviews also showed that looking for information was not always a complex business involving multiple stages and sources. For one participant, the act of looking for information (an example of a particular type of document) was as simple as carrying out a quick search through their email inbox. There seemed to be no obvious pattern connecting the type of information sought and the way in which the search was approached. Intelligence type information was searched for in a structured way using documented information available online by one participant, while in another case intelligence was sought through a combination of colleagues and internet searching. Colleagues or experts were also a feature of searches for both discrete factual information and general subject knowledge.

## **6.5 Communication, discussion and dialogues**

Many of the situations described included an element of communicating or discussing information. In characterising these situations in terms of their emphasis on communication, it is tempting to forget that depending on what is meant by communication, all situations involving information could have some aspect of communication to them. An individual reading a piece of information that they have found could for instance be seen as the recipient of a communication, and therefore involved in communication of information just as much as another person actually writing a document or preparing a presentation that they expect other people to receive.

Involvement in the communication of information in the situations described by participants could be direct or indirect. In one case (participant 4), this did not involve the participant directly communicating information themselves, but involved them setting up a forum for another to communicate information to colleagues. In a number of cases however the participants were describing situations where they had an active involvement in communicating information to others. Communication or rather attempts to communicate were not always plain sailing. For one participant in particular (participant 8) attempts to communicate were difficult. This participant described a situation where they had been attempting, from the point of view of a small organisation, to communicate something to a large national organisation. The general feeling that came across from the participant during this interview was one of frustration – it was felt that they were not listened to and that their attempts to communicate were therefore not successful.

Some of the situations described appeared to have quite a reliance on two-way communication, this being part of the main purpose of the task. There were three situations described where participants had set up face to face events – in one instance a conference event (participant 10) and in another a workshop (participant 11) and in a third a focus group (participant 12). The sense of purpose of these tasks that came across during the interviews was in some cases one of dialogue – “knowledge exchange” was the phrase used to describe this by participant 11. It appeared that sometimes the events were intended to function as dialogues and conversations between organisers and participants rather than pure information gathering or dissemination exercises. The workshop example particularly showed this and was reported by one of the participants working in an academic setting. This workshop had been set up as a forum to discuss research findings and potential public health interventions among different stakeholders, including research participants. The event therefore seemed to function both for the participant to gain additional information, but also for the attendees to give further information that might help to modify ideas from the previous research – “co-analyse” was the term used by the participant to describe this. There was an

emphasis through this interview of a desire to use the workshop setting to make the research participatory. In the conference event, the participant reported that this the event worked well when it generated discussion and interaction between attendees, rather than simply having the speaker giving out information. The participant had intended to try and stimulate discussion through the event, as they had mentioned structuring in opportunities for discussion. Once again, the emphasis on dialogue can therefore be seen, but in this case there was nothing in the interview to suggest that the discussion took place between event organisers and attendees – it seemed to have been largely taking place between attendees with organisers taking on a stimulating role. Similarly, for the focus group reported by participant 12 – the idea here was to provide an opportunity for members of the general public to discuss issues of concern to them. The use of a focus group format once again suggests a structuring and stimulating role for the event organisers – the intention behind the focus group seemed to be to give the attendees a voice and a chance to be heard, rather than for them to be talked to by organisers.

Communication as seen in the various situations described by participants varied according to the degree to which that communication seemed to be one way (even if at times one way communication was not in fact what the participant sought) to two way. There were instances where the key to the activity seemed to be to generate a conversation between the participant and their event attendees, with each contributing perspectives. There were also instances where it seemed that the participants really wanted to listen to the opinions of others rather than giving their own ideas, and instances where the reverse seemed to be true.

## **6.6 Creating and synthesising information**

Participants 3, 4, 9, 12, 13 and 14 all talked about activities or situations that included an element of creating new knowledge, for instance through synthesising existing knowledge sources. Once again, as with other elements of the tasks narrated by participants there was a high degree of variation in approach to synthesis and the kinds of information used.

Participant 3 talked about getting evidence together from different sources, and seemed to think of these sources of information in fairly structural terms according to how they had originally come into being. Primary data was mentioned as one type of information that was needed, as distinct from another type, referred to as 'literature' which seemed to mean pre-existing literature on the topic – reference was made to documents from the WHO and also systematic reviews. Participant 4, as described above, was seeking to develop some background knowledge as a precursor to updating a set of policy asks. The participant used a specific term, framing or re-framing to describe the process of gathering and synthesising this information. Framing, and what this means in terms of finding and using information will be discussed further in chapters 7 and 8. However, in simple terms, it seemed to mean synthesising new information found with already known content or information in such a way as to present familiar content in a new light that might have fresh appeal to others.

Participant 12 talked specifically about the need to gather evidence to present an issue in an 'evidence based' way, and this seems to have included a scientific/academic written presentation of a synthesis of information on a particular health issue. Participants 9 and 14 both seemed to deal more with quantitative information. Where many of the other participants were involved in presentations of information through written narratives (although in some cases these including presentations of facts and figures, or trends), participants 9 and 14 seemed to be more fully focused on presenting quantitative data to their audiences. For both participants, finding a way to make sure that this information was notable and noticed was important. This manifested either in attempts to ensure that information was presented in an accessible and appealing way for a certain audience, or in attempts to ensure that the picture or message conveyed by the information was stark and difficult to ignore. Participant 13 described synthesising information that seemed for the most part to consist of formal academic research, into a set of guidelines providing recommendations for public health. The act of synthesis presented here is perhaps the most formal of the synthesis processes described by participants as it involved moving through a series of defined stages of gathering and reviewing evidence.

## 6.7 Conclusion

This chapter presents a narrative, descriptive overview of the participants and the tasks which they chose to describe during interview. As well as providing the reader with a more in-depth understanding of the participant group for this research, the chapter also highlights the level of variety in this group of individuals. Although over half of these participants worked for non-profit public health organisations, the tasks and interactions with information which they described were different each time. Motivations, and approaches differed. The same was true of the participants working in higher education institutions, where even within a small number of participants, a range of different tasks, approaches and motivations were described. This level of variety is both interesting and challenging. It is interesting because it illuminates the diversity of the public health workforce, which is apparent even within a small cross section of this group. This diversity is challenging from a research point of view, because for the Grounded Theory analysis attempted in this thesis, detailed coding of interview data is required. Detailed coding of varied data may be expected to generate a large number of codes, with which the research must then work, determining differences and similarities in data, merging and grouping codes where appropriate and making decisions about which codes or elements of data are most relevant to the topic of information use. The process of this coding, and the resulting codes and model developed will be described in chapters 7 and 8.



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## **7 Open to selective coding**

### **7.1 Introduction**

This chapter describes the output generated by the process of open coding, and the gradual development of selective codes. The chapter will begin by explaining some of the practicalities of the process of coding.

A total of 14 interviews were carried out between May 2015 and August 2016. Each interview lasted between 30 minutes and 1 hour. Throughout the interview period an anonymised spread sheet was maintained, tracking the progress of arranging and carrying out interviews through to receipt of participant approved copies of transcripts. All participants agreed that they were happy for interviews to be audio-recorded. Following each interview, the first step was to create a typed transcript in MS Word. All transcripts were typed up by the researcher, and then emailed to the interviewee. Interviewees were invited to read over, check and amend their transcript, or to confirm that they were satisfied with the original transcript. Once the interviewee had confirmed that they were happy for analysis to proceed, analysis of the approved version of the transcript (including any amendments requested by the participant) began. Each separate transcript was assigned a code e.g. the transcript produced from the first interview was labelled P1 for Participant 1. These codes are used to identify quotations belonging to specific participants, which have been included in chapters 7 and 8 of this thesis. Coding and quotations were organised in an MS Excel spread sheet, with memos recorded in Word documents. Analysis of the transcripts began as soon as the first transcript had been approved by the relevant interviewee.

### **7.2 Beginning to code the data**

Although there are several schools of thought on how the coding process of Grounded Theory should be carried out, this process always consists of several stages. Glaser has these stages as open, selective and theoretical coding (Urquhart, 2013c). Corbin and Strauss have the process as open and axial coding (Corbin and Strauss, 2008). Whichever

school of thought is followed, the process always begins with open coding. Open coding is guided by the broad research topic at hand – this topic is used as a frame to focus the researcher’s attention on aspects of data that are of interest to the research, and should therefore be coded (Urquhart, 2013a).

As chapter 4 explained, the two fundamental concepts to this research (information and use) are both poorly defined, and exist with multiple interpretations in theoretical literature, as well as multiple framings and applications in existing empirical research. The present research aimed to have an inclusive and encompassing conceptualisation, using sense-making as a frame for understanding information use. The project research questions presented in chapter 5 are framed within sense-making, and reflect the sense-making understanding of information use (see chapters 4 and 5). Information use was therefore defined holistically, which had the effect of necessitating a very inclusive approach to coding, in terms of deciding what elements of data might be relevant to information use and should therefore be coded. While advantageous in allowing the research to avoid becoming restricted to narrow views of use such as documentary use, citing of references and decision making, this open conceptualisation did present some challenges as a frame for open coding. The main challenge was in determining, within this very loose frame of any form of information which helped participants in any way to make sense of and move through their situations, what was and was not of relevance to information use and should therefore be coded. As a result, a large number of codes were initially generated, with over 100 open codes created in total during the course of the data analysis, which took place over a period of 3-4 years.

Over time this list was refined. Some codes were discarded because it was felt that they related to topics that were not really of interest to the research, for instance information seeking activities, difficulties in accessing information, emotional reactions to information or categorical types of information that participants referred to (e.g. systematic reviews or journal articles). In many cases, as the coding process continued, and coding became more analytical, it became apparent that different codes were actually expressing the same

underlying ideas. In these cases, codes were merged with all quotations related to what had been separate codes originally being grouped under a chosen single code. The process of deciding whether or not two codes should be merged was essentially carried out through constant comparison. Constant comparison is the comparison of pieces of data against one another to detect underlying similarities and differences (Parry, 2004). The concepts which emerge from coding are compared to one another and to further data to determine if they are replicated or if new concepts are present (Holton, 2007). Quotations belonging to specific codes were transferred to Word documents and scrutinised to help make decisions about merging codes. These exports consisted of a Word document containing a table listing each section or quotation of data indexed under that code, usually consisting of a few sentences or a paragraph from the relevant interview. The table also had a column for notes alongside each quotation, documenting a combination of descriptive commentaries and sometimes analytical thinking relating to that quotation, why it had been linked to the particular code, what the underlying meaning was and how it was similar to or different from other quotations organised under the same code. These tables were also over time accompanied by longer, running analytical memos at the top of the page, which were amended and added to as the analysis progressed. It was often useful to make notes in the Word documents of overlaps between coding for quotations when considering a merger. If, for example, it began to appear that two codes were very closely related and may in fact express the same idea, all of the quotations belonging to these two codes would be cross checked for their coding. If there was significant or complete overlap in coding between the two codes in question, AND the codes were considered to be expressing the same or very similar ideas, the two would be merged, with one of the labels chosen for use going forward. The phrasing or labels chosen for codes included a mixture of in vivo codes (those named using words or phrases used by participants) and analyst-derived codes (those named by the analyst according to their interpretation of the data) (Corbin 2004). A final code book describing the open codes was created. This code book incorporated a summary definition for each code, a list of relevant participants and example quotations, as shown below and in appendix 8:

Figure 7-1 Image of code book for final set of open codes

**Appendix 8: Code book for open codes: May 2019**

\*Evidence/Evidence Based Practice and Influence are included in the code book because they entered the analysis as open codes during the first round of coding. However, they were moved to different positions in the hierarchy of codes developed during later stages of the analysis. 'Influence' became a selective code, acting as a parent category for a number of the other open codes. 'Evidence' developed into 'Evidence Based Practice', which became a theoretical code. The descriptions of 'Influence' and 'Evidence/Evidence Based Practice' given in the chapters of the thesis which present the results and analysis of this research reflect the final positions of these codes in the model of behaviour which was developed – as such they are not described as open codes within these chapters.

Open code	Definition	Relevant participants	Example interview quotations
Checking a specific source	Used where participants describe going to a specific defined source for information. This code is about the process of each participant using their personal experience or knowledge in the process of deciding what information will be the best source to consult. This information might consist of an organisational source to be searched for online, or it might consist of making a judgement about which colleagues or other individuals known to the participant may be useful to consult. It might also consist of knowing what type of publication and	P1, P2, P3, P5, P14	<i>"So I haven't got the answers, my next step is another strategy for trying to get information, which is that I spoke to [...] who is the head of policy for [...], so that next time she goes along to the [...], it's a question she can ask and I think that's probably the route that I want to pursue since I haven't yet managed to find an authoritative view, which is to keep on asking the prompting questions. I also asked [...] from [...] who had no particular evidence either way." (P1)</i>

Following this process of attempting to focus the analysis on information use within the frame of sense-making and merging codes where appropriate, a final list of open codes was determined:

- Checking a specific source
- Constructing options for moving forward
- Decision making
- Effects of narrow perceptions of evidence
- Evaluating information
- Evidence
- Evidence is a mixture of things
- Expert information and witness
- Facts and truth
- Framing an issue
- Good quality grey literature is more relevant

- How do we make sure everyone is on the same page
- I need evidence to be presented in a way that's useful
- Influence
- In order to get some headlines
- It's always the result of an interaction
- It's good to have the authority
- Looking for consequences
- Need to be evidence based can be a barrier
- Obviously quantitative evidence is better than qualitative
- People want to reject evidence when it cuts against their views
- Public health and public health research are not always the same
- RCTs are often not the answer
- You're trying to build a case
- You have to have an audit trail of evidence
- Understanding local context is important evidence
- Verifying and cross checking information
- We weren't going to have all the answers

Following the exercise of open coding, the research moved towards the grouping of the open codes generated together into clusters or themes. This is sometimes referred to as selective coding (Urquhart, 2013b). The following sections present these open codes, grouped according to themes or clusters which were derived during analysis. Each section describes the development of a different selective code. A table at the start of each section provides a breakdown, in alphabetical order, of the open codes brought together to make the relevant selective code. The selective codes formed are: 'personal experience, knowledge and perception of information', 'experience of external perceptions of information', 'integration and evaluation of information', 'influence', and 'paths to influence'. These selective codes,

and the open codes which help to form them are then discussed in detail within their corresponding section, with an effort to highlight commonalities between open codes, which caused those codes to be grouped together as a single selective code. The genesis of each open and selective code is explained, setting out what drew certain quotations together firstly into an open code, and then latterly what drew certain open codes together into their parent selective code.

### 7.3 Personal experience, knowledge and perception of information

The first selective code discussed in this chapter is 'Personal experience, knowledge and perception of information'. There were in fact two selective codes with labels including the term 'perception'. This term was chosen in an effort to retain awareness that much of what seemed to be suggested by the interview data represented an individual's personal views on information. The idea of individual reactions during interactions with information became very important during the analysis, and this will be explained in detail in the next chapter. The open codes which were grouped to form the selective code 'Personal experience, knowledge and perception of information' are shown in table 7.1. The open codes listed in the table initially were noted to share a common feature in that they all referred to a type of information.

**Table 7-1: Open codes forming the selective code 'Personal experience, knowledge and perception of information'**

Selective code	Open codes
Personal experience, knowledge and perception of information	<ul style="list-style-type: none"> <li>• Evidence is a mixture of things</li> <li>• Good quality grey literature is more relevant</li> <li>• Obviously quantitative evidence is better than qualitative</li> <li>• Understanding local context is important evidence</li> <li>• Facts and truth</li> </ul>

	<ul style="list-style-type: none"><li>• People want to reject evidence when it cuts against their views</li></ul>
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The open code 'Evidence is a mixture of things' arose because participants sometimes listed a diverse range of things which they classed as evidence, or otherwise referred to diversity in evidence. The formation of this open code did not rely on participants actually describing the information they were using as 'evidence'. It was based on an interpretation of evidence which was gradually developed from the interview data. This interpretation stated that evidence was the use of information as a basis for recommendations, as a justification, as a support for an argument or making a case, combined with a reference to the use of a diverse range of material or the need for flexibility in defining evidence. Understanding evidence and its role in the situations described by the participants became very important to the analysis. Selected quotations from 'Evidence is a mixture of things' are provided below:

*“So, a line, my line on this is, that good evidence is, comes from a variety of different sources.” (P8)*

*“I guess coming from a mixed methods angle, so I think our whole team see evidence as kind of, it tends to be a jigsaw of evidence, so you have, you know, no evidence can tell you definite answers, so even a clinical trial can't give you definite answers.” (P11)*

*“So that's why you have to have a pluralistic view of the evidence, and you get, you can, if you get an expert coming along, then you have to have- every recommendation that you make you have to have an audit trail of the evidence.” (P13)*

In the early stages of coding, a reference to 'evidence' or use of evidence was understood as the use of a type of information in a particular way (as described above). This



understanding changed and developed through later stages of the analysis. This will be discussed in more detail in the next chapter.

Four of the open codes listed in table 7.1, 'Good quality grey literature is more important', 'Quantitative evidence is more important than qualitative evidence' and 'Understanding local context is important evidence' developed from references that participants made to those specific types of information and their relationship to evidence. Selected quotations from these codes are below:

*"[...] the cabinet office [...] produced a report for policy makers on the sorts of things that they should consider as evidence in developing policy, and they counted everything, not just scientific journals, but consultations, expert information and witness, you know the experiences of practitioners. They were encouraged to consider all those different types of information in, as evidence in terms of informing policy development. [...] So, er, you know I do think you need to consider a broad range of things, and not just go for stuff that's published in scientific journals, because often it might not answer the questions you want [...]" (P6)*

*"So, what you get is you can have rational evidence, but at the same time actually one of the big players, and this exerts its pressure on local politicians, is culturally what people actually feel would make a nice environment where they live. So I know it's a long winded answer to your question, but that's the actually the nature of and the joy of evidence, you know it's all those different things. And it comes back actually to my [...] example." (P8)*

*"Er...so I mean, there's a fair amount of kind of quantitative data you get from public agencies normally, and I would include that although that's always taken with a pinch of salt because of the way in which its collected, the questions that are asked...you know any kind of representation of reality is always kind of a reduction of reality. And with kind of qualitative evidence, it's, I would say... so you know the experience of*

*people as they perceive the world and as they perceive what's going on around them is critical especially when...you know you're kind of dealing with the idea of health or wellbeing.” (P12)*

Reflection on the data related to these open codes revealed that in many cases it expressed a contrast between information that could be seen as more objective (this objectivity appeared in various forms e.g. references to peer reviewed journals, quantitative information or rational evidence) and information that could be seen as more subjective (e.g. non-peer reviewed grey literature, qualitative research or individual experiences and perceptions). At times, the drawing of this contrast seemed to indicate tension between objective and subjective information, with participants implying that they felt under pressure to make use of information regarded as more objective, when actually they thought that other, more subjective forms were also valuable. For instance, participant 11 talked about the way in which qualitative research can be criticised for not being representative of a population:

*“So I think I'd probably challenge the idea of kind of evidence hierarchies in that sense that say a clinical trial is the best kind of evidence, because they have great internal validity but they are not particularly well representative of the population. And I quite like that sort of cheeky example when people say the kind of qualitative evidence I guess I produce is not as robust or representative as sort of quantitative evidence.” (P11)*

This tension was not uniform across all four codes however, and this was one reason why the four were not merged into a single open code – it appeared most obvious in the code for 'Evidence is a mixture of things'. However, all four codes did seem to be uniform in suggesting a need to step beyond objective information in order to more fully understand the world. Reasons for taking this step could vary – in some more pragmatic examples they seemed to also include the literal ability to access information (journal subscriptions are expensive and not available to all and grey literature is usually freely accessible). A need to understand how people's subjective views on reality might affect their interactions with the

output of scientific research (i.e. proposals made as a result of that research) seemed to be important. Subjective information therefore began to appear to be just as important to the participants as more rational or empirical evidence.

The open code 'Obviously quantitative evidence is better than qualitative' also highlighted the fact that different perceptions of these types of information exist, and that participants sometimes encountered alternative viewpoints to their own which they found challenging or sought to challenge. This underlined the importance of bearing in mind an individual's subjective perceptions, and the affect this has on their interaction with information.

Particularly relevant to this is the quotation from participant 12 above, who describes any representation of reality as a reduction of reality. In fact, this quotation is phrased so as to apply to any form of information and could be taken to apply equally to quantitative or qualitative research. This could mean that humans cannot create information which accurately and completely represents reality – why this might be difficult and why it could be important to understanding interactions with information will be discussed further in the next chapter.

A large amount of data came to be organised by the code 'Facts and truth', which began as a way of organising instances where participants made specific references to facts. As with other open codes falling under the selective code of 'Personal experience, knowledge and perception of information' the data represented by the open code 'Facts and truth' provided an insight into the types of information which participants were interested in. As coding developed, the code was also used to organise data which lacked these specific terms of fact or truth, but seemed to address the idea of truth, understood as how well information reflected reality, or rather how participants seemed to approach the idea of representation of reality when interacting with information. For example, 'Facts and truth' was also used for situations where participants talked about interacting with information in a way that suggested that they were hoping it would provide them with a definitive answer, or perhaps an authoritative understanding of the world – an understanding which they could comfortably

believe to be right or correct. This included situations where participants looked for, or were interested in information which might commonly be described as a fact e.g. the prevalence of a disease or condition, or information that provides confirmation that an event has taken place or an association exists.

*“The CDC is suggesting something between...I think it actually said something like 1-4% of the population with [...]. [...] doesn't show physically necessarily.” (P1)*

*“I needed to know what kind of harms [...] was associated with...I then needed to know how high-income European countries stood in comparison with those global figures. I wasn't requiring a great deal of numerical precision. I mean, I wanted the evidence to be good, but I wasn't going to report the numbers in any great detail.” (P3)*

*“Er, because it has a concise summary of the evidence, er, just setting out, you know, this is the nature of the problem, this is how big the burden is, this is what's causing it, er...without getting into too much detail but including references that if I wanted that detail, I could go back to.” (P6)*

It is important to note that these interactions with information were not always successful – participants may have sought this kind of knowledge, but have been unable to find it, or have found information which conflicted or had caveats attached affecting how easily they were able to accept it as correct. Some of the quotations within ‘Facts and truth’ came from the think aloud part of the interview. In these instances, participants questioned the underlying detail of what they were reading, such as how certain elements of the information were defined. This seeking of precision in information could come from a desire to pin down the parameters of the information to determine factual correctness. For instance if an article claimed that obese children generally go on to become obese adults, the participant might reflect on whether this was true, and also more deeply – under what circumstances would this be true, commenting that such links are not as straightforward as they first appear,

presumably because there may also be many other factors apart from body weight in childhood which affect body weight in adulthood:

*“Er, [Reading out loud from article]: “obese children often go on to be obese adults, carrying with them an increased risk of heart disease and diabetes”. Now I’m half remembering discussions on this point from when I worked at [...]. Problematizing that sentence, although I dare say it’s probably true that er, it’s not a simple link.”*

(P3)

As participant 11 noted, there is a need to understand the limits of evidence:

*“So good evidence is not simplistic evidence, but understanding its limits.”* (P11)

The common ground of ‘Facts and truth’ is that participants are attempting to discern facts, and they are not always going to accept things presented as facts without question – they can and do probe further to determine what conditions need to apply in order for a purported fact to hold true, and to match the reality of the world. The code for ‘Facts and truth’ therefore seemed to add understanding to the picture of how participants interpret the information that they interact with, as developed through the analysis of the other open codes grouped under ‘Personal experience, knowledge and perception of information’. Participants’ efforts to establish the boundaries of the truth within information were identified through the code ‘Facts and truth’, which implied an emphasis on the importance of objective information, and therefore contributed to the understanding of how participants interpret information as either objective or subjective.

The final open code grouped under the selective code ‘Personal experience, knowledge and perception of information’ is ‘People want to reject evidence when it cuts against their views’. As its name suggests, this code represents the idea that as individuals interact with information, they are not able to attain an ideal standard of objectivity in how they perceive that information. Instead, they may consciously or unconsciously be influenced by personal

or professional agendas, rather than taking the information purely on its merits. Participants experienced and recognised this feeling both in themselves and others.

*“I you know, I openly admit that I am more likely to fall on the evidence which is going to tell me that this it needed and this is important, I’ll be like, yes, that evidence is correct and the other evidence must be, you know.” (P5)*

*“Public health suffers to some extent in the public imagination from a, problem of, ‘well, I could have told you that’, you know stating the bleeding obvious about how having too many takeaways might make you fat and so on. But at the same time people want to reject evidence when it cuts against their pre-existing views: “it’s all about personal choice” or “my uncle ate red meat all his life and live to 93”.” (P9)*

Based on this data, it appeared that personal knowledge was sometimes used as a criterion for making judgments on information e.g. whether to believe something or not, effectively whether it fits with what the participant already knows. Participants also believed that this tendency existed in other people. Interestingly, the pervading idea of this code, that people may or may not be influenced in their reaction to information by their personal agenda, isn’t recognised as ‘bad’ or ‘good’ in all cases. In a discipline which presents itself as a science, we might expect the discipline to strive for objectivity and attempt to avoid bias. Bias arising because individuals allow themselves to be influenced by their thoughts and preferences in how they react to information would be viewed unfavourably. There is some evidence to support this in the interview data. For example, participant 7 described following evidence, even if they didn’t like what it said, as a positive attribute of their organisation:

*“Yeah, I think, it is really important, so important with the understanding that when it becomes a barrier, but it will always be the desired effect and I think that’s shared amongst the sector that we will always strive to get that evidence. If it is within our reach we will fund it, and we will follow what we call, what the evidence says. I think that’s what we’ve got a very good understanding of at [...] is...commonly we*

*commission research, and it might come up with results we don't like, but we listen to it. Whereas I don't think every organisation does that." (P7)*

The open code 'People want to reject evidence when it cuts against their views' therefore helped to develop the understanding of the way in which participants interact with information. The combination of open codes discussed up to this point had highlighted that participants perceive a difference between subjective and objective forms of information, and that they experience some difficulties in applying these different forms of information in their work. These codes also demonstrate that objectivity and subjectivity in terms of reaction to information, as well as in terms of characteristics of information itself is an important factor to consider in how the participants experience interactions with information. The interviews highlight that participants have a degree of awareness of not only objectivity inherent in the information they handle, but in the objectivity of their reactions to that information and the reactions of others.

#### **7.4 Experience of external perceptions of information**

The second selective code is 'Experience of external perceptions of information'. Unlike the previous selective code, this second code focused on the viewpoints of the participants on other people's interactions with information. Although the nature of the research means that inevitably the data still deals with participants own perceptions and experiences of those interactions, this particular code differs from the 'Personal experience, knowledge and perception of information' because it concentrates on what participants thought about the perceptions and experiences of other people. Four open codes are grouped here: 'RCTs are often not the answer', 'Need to be evidence based can be a barrier', 'Effects of narrow perceptions of evidence' and 'Public health and public health research are not the same. A table listing these codes is provided below.

**Table 7-2: Open codes forming the selective code 'Experience of external perceptions of information'**

Selective code	Open codes
Experience of external perceptions of information	<ul style="list-style-type: none"> <li>• Effects of narrow perceptions of evidence</li> <li>• RCTs are often not the answer</li> <li>• Need to be evidence based can be a barrier</li> <li>• Public health and public health research are not the same</li> </ul>

'Effects of narrow perceptions of evidence' focused on understanding how the perceptions of others impacted on participants experiences of interacting with information. In terms of quantity of data, it was one of the smaller open codes created. However, it seemed important to highlight this data by separating it out with a dedicated code because this data seemed to indicate that participants underwent a struggle to reconcile their own perceptions of evidence, and the perceptions of other people. Similarly to the data discussed in section 7.3, data within this code also indicated that a division between subjective and objective information might be important. For instance, participant 8 described other important figures in public health as having a view that public health was based on 'scientific evidence', with the reference to science indicating an association with objectivity. Participant 11 described the struggle to get the validity of qualitative research accepted in certain quarters, implying that they perceived there to be a greater acceptance of forms of research perceived as more objective.

*"There's a bit of evidence in the academic evidence, there's a lot of personal experience, there's a lot of, you know, political judgements, you know those are some of the – and there are some pragmatic attempts that are to do with the resources that are available. Quite a lot of the time I think, and indeed I think that some of the stuff that Sally Davies has put out recently, there's almost a delusion that's around, which is that we're a very rational profession that takes actions that are*



*primarily informed by in inverted commas, 'scientific evidence'. That's just not true."*

(P8)

*"[...] I think it's problematic if people who are the editors of journals or even people who dominate say political debate have a very narrow view of what is evidence and don't understand that maybe it has to be more broad I guess, how we view things and how we see if things work or not." (P11)*

All of the data organised under 'Effects of narrow perceptions of evidence' highlighted the difficulty that participants experienced in having to interact with others who had different, and possibly narrower views on the importance of different forms of information of relevance to public health work. The specific use of the term 'evidence' in understanding and theorising about these comments is of relevance and will be returned to in the next chapter. However, for the time being, the key point of interest is that this difficulty in reconciling differing perceptions of information seemed to apply to what might be regarded as a specific form of information – 'evidence'.

Comments made elsewhere in interviews indicated that restricted ideas of evidence might refer to something specific that the participants encountered. These comments were captured in the code 'RCTs are often not the answer':

*"Yeah, so I think it's, so whilst I say we're an evidence based organisation, there are particularly with [...], there are moves...there are interventions that waiting for that perfect evidence provides a barrier to, because we're never going to get that evidence base. Er, an example would be a very popular supported call of a [...] ban on [...], and the common counter argument we get from industry is we want to see the longitudinal real-life study of what influence [...] added to [...]. And we're never going to get that. [...] we're going to continue to add to the midfield, but we're never going to get that because it's impossible to get that." (P7)*

*“[...] when I’m formulating a strategy or doing stakeholder mapping with either academics within the organisation or with policy makers, practitioners outside the organisation, there’s actually those interpersonal discussions, I guess what would be called, if it was done more formally, qualitative work, becomes really important. And I think that it’s interesting in the group that I’m in that we have a strong emphasis on the importance of qualitative research as part of the research package. In a world of complex public health interventions, RCTs are lovely if you can do them, but actually, they’re not the answer often, to the problems that we’re trying to.” (P9)*

*“So I think I’d probably challenge the idea of kind of evidence hierarchies in that sense that say a clinical trial is the best kind of evidence, because they have great internal validity but they are not particularly well representative of the population. And I quite like that sort of cheeky example when people say the kind of qualitative evidence I guess I produce is not as robust or representative as sort of quantitative evidence.” (P11)*

The common theme of data with ‘RCTs are often not the answer’ was the reference to hierarchies of evidence and randomised controlled trials. This hierarchy of evidence is a well-known framework for relating different forms of research evidence to one another, ranking them in terms of the robustness of their design. Forms of research which are ranked as more robust are characterised as being more objective. In common with the data organised within the code ‘Effects of narrow perceptions of evidence’, data belonging to ‘RCTs are often not the answer’ hinted at interactions with other people as an important factor in participants’ experiences of interacting with information, and also at a struggle with the idea that information must represent an absolute ‘truth’ in order to be valid and useful. Participant 9 mentioned the shared emphasis on the importance of qualitative research amongst a group of colleagues as being something that was beneficial, while participant 11 talked about the way in which others might question the value of certain types of evidence and about their experience of responding to these questions. The link between these

quotations lies not only in the mention of the hierarchy of evidence, but also in the fact that for participants, whether or not tensions are experienced may depend on the perceptions of those with whom they are interacting and the content of those interactions. Participant 7 for instance seems to have experienced difficulty in winning arguments related to certain public health interventions through criticism of the type of evidence available. It is possible to infer from the reference to 'perfect evidence' and 'real life longitudinal studies' that the supporting evidence to these arguments had been criticised because it could not offer guaranteed proof. It is not clear from the data precisely what kind of evidence had been put forward, or exactly what was thought wrong with it, but the implication is that a real life longitudinal study would in some way be better. Similarly, participant 11 refers to criticisms of qualitative research as not being 'robust', and this may be another way of saying that qualitative research cannot generate transferable truths for the world at large. Adding to the picture of difficulty experienced when interacting with people who hold different views on evidence, 'RCTs are often not the answer' filled in some additional detail to these experiences, by highlighting the relevance of perspectives on objectivity of evidence to these experiences.

At times participants actually seemed to experience the need to be evidence based as a barrier in and of itself, as evidenced by the quotations ordered under another open code, 'Need to be evidence based can be a barrier'. This feeling may have stemmed from encounters with people with different perspectives on evidence. Selected quotations from this code are:

*"Yeah, I think, it is really important, so important with the understanding that when it becomes a barrier, but it will always be the desired effect and I think that's shared amongst the sector that we will always strive to get that evidence. If it is within our reach we will fund it, and we will follow what we call, what the evidence says..." (P7)*

*"Then, so there I've just read the bit about how, the cost [...] that kind of thing makes me quite angry because I know that schools budgets are under a lot of pressure and I know that if they don't protect that part of the budget that the chances are that*

*certainly some schools might just start spending money on other things because they're under pressure to raise standards and it's probably too early to start having concrete proof that having better nutrition is raising standards [...] there's not much evidence for it yet." (P10)*

*"So...it is important...if only to be able to assess kind of effect, you know, so that you're not kind of doing something without any kind of idea as to what is happening. I would say there are issues so, they're using the example there of where there aren't really any specialised services, there's no real attention, from any significant health body, in part because there'll be the demand that you have to show er, that you have to demonstrate evidence before you can, or demonstrate evidence of need, er, so you know I think the need to be evidence based can be, can be used as a barrier in that way." (P12)*

A common factor here was the effect of external pressure. Essentially, these participants seemed to be saying that in a world where evidence was regarded as important, the absence of evidence for a public health intervention could result in the intervention being de-prioritised or discarded. Participants 10 and 12 refer to the need to have evidence of need for something, or that something was effective. Participants 7 and 12 describe the need to be evidence based as a barrier in situations where evidence was not available. The words 'pressure' and 'demand' are used by participants 10 and 12. Beyond the surface grouping of these quotations because of their reference to experiencing barriers, the reference to pressure and demand indicated the influence of external pressures. The influence of the external, which may originate from other people, was the key reason why this set of quotations came to be grouped alongside 'Effects of narrow perceptions of evidence' and 'RCTs are often not the answer'. All of these open codes describe how interacting with others affects participants experiences, whether this is due to differences in views of information or other social or political influences.

By its very nature evidence is a form of information that directly involves interaction with other people or other groups in some way. The purpose of evidence includes justification, supporting arguments and to make a case, as stated in section 7.3. This purpose involves other individuals as recipients of a case or argument. It is not the need to be evidence based that is in itself a barrier, but it is the fact that other people are able to turn it into a barrier by seeking reasons to reject arguments – either because they lack evidence or because the evidence that is available can be critiqued in some way.

However, there is one contrary voice here, in participant 13, who claims that you can produce guidance (something which usually requires an evidence base) even in the absence of evidence. However, the participant then goes on to say, that it depends on what you mean by evidence. This seems to provide further support to the idea that perceptions of evidence, including those of other people, are important factors in whether or not the need to be evidence based is experienced as a barrier:

*“Ok, and you were saying about the evidence...you produce guidance despite the evidence. I mean, it depends what you mean by evidence. I mean despite the lack of the sort of intervention study stuff, you can still produce guidance.” (P13)*

It is suggested that different kinds of evidence may be perceived by others as being more or less robust and that when the only available evidence is not seen as robust, this can present a problem. Therefore, it is not just evidence itself that matters - it is also how people see that evidence.

The final open code in this group, ‘Public health and public health research are not the same’ captured a feeling that public health research, (which according to various publications on public health evidence, e.g. Petticrew and Roberts (2003) and Armstrong et al. (2014), is a form of evidence) was not the only influence on public health. This code initially developed with a strong focus on the political pressures which participants indicated affected their experiences:

*“So there’s a whole process there about how we do that, in the light of the current government. So there’s some sort of possible re-framing of the way we talk about them that might be more relevant to the current politics. But you know more specifically in relation to those gaps in our knowledge, so you know we had to sort of take a step back, or at least I did, as the sort of person who is coordinating all of this, and say, well actually the goal is that we need to get a bit more up to speed on these issues, I don’t feel particularly up to speed, and um, understanding what...well actually the goal was to develop new policy asks...” (P4)*

*“There’s a bit of evidence in the academic evidence, there’s a lot of personal experience, there’s a lot of, you know, political judgements, you know those are some of the – and there are some pragmatic attempts that are to do with the resources that are available. Quite a lot of the time I think, and indeed I think that some of the stuff that Sally Davies has put out recently, there’s almost a delusion that’s around, which is that we’re a very rational profession that takes actions that are primarily informed by in inverted commas, ‘scientific evidence’. That’s just not true.” (P8)*

*“I think the thing about public health is that public health research and public health are not always the same, and public health can become very politicised. For researchers, it can be quite a struggle sometimes to find the right balance between evidence sharing and advocacy.” (P9)*

Closer attention to some of these quotations revealed that politics was not the only influencing factor. Influences were also felt by some in terms of getting evidence that they were involved in producing published. Participant 11 and participant 3 experienced this. This code gradually grew to encompass broader influences than politics. From beginning with a focus on participants encountering political influences that affected their use of evidence or finding that those in positions of power (such as journal editors) might affect their ability to make research available, a more analytical side to the code developed. Firstly, there was a

realisation that some individuals may hold a certain view of the impact that research could have on public health. This view might amount to a belief that whatever actions or recommendations were suggested by research would and could be implemented in reality, and that these actions would lead to the same result as seen in the research. Secondly, some participant's comments seemed to imply that this view was naïve, attempting to provide a 'reality check' – saying that public health research never could and never would be at one with what measures were actually implemented or the results of those measures, because there were too many other influences at play:

*“Er, so yeah I think I think the conservatives are [...] and they're going to cut free school meals, which to me is a really important provision for, not just low income families but middle income families as well [...], I openly admit that I am more likely to fall on the evidence which is going to tell me that this it needed and this is important, I'll be like, yes, that evidence is correct and the other evidence must be, you know.”*

(P5)

*“I suppose broadly the same thing you are achieving by trying to translate and communicate all evidence, which is a greater awareness of what the evidence says vs. what people reckon they know. Public health suffers to some extent in the public imagination from a, problem of, ‘well, I could have told you that’, you know stating the bleeding obvious about how having too many takeaways might make you fat and so on. But at the same time people want to reject evidence when it cuts against their pre-existing views: “it's all about personal choice” or “my uncle ate red meat all his life and live to 93”.”* (P9)

*“And, to me the kind of overwhelming issue that often evidence is overwhelmingly ignored by decision makers. So we've done a fair amount of work on the impact of [...] policies on health and health inequality as well as knock on effects on people [...] er, and being involved even kind of slightly in the kind of current debates on [...], the extent to which the evidence is ignored is quite staggering. [...] You know, there's the*

*kind of wilful ignoring of evidence where it doesn't fit an ideological frame, almost it's considered to be inconvenient.” (P12)*

It is notable that for two of the above quotations, participants are describing ways in which other people, with whom they have dealt, can react to evidence – by disregarding it if it does not agree with their pre-existing beliefs. Participant 5 above admits to being possessed of their own inner bias rather than describing that of others. The unifying factor is therefore the experience which participants have of encountering bias in people's views of evidence. The situation referred to by participant 12 above may reflect issues around what are accepted as norms or normative behaviours among different groups. Normative claims represent expectations about the world - that there are certain accepted standards of what should happen, and that individuals should live up to these standards (O'Neill, 2013). It is possible that among the participants in this research, the basing of decisions and actions on evidence (rather than ignoring evidence because it does not fit in with what is easy or preferable to do) is a norm. This certainty seems to be the case based on interview data as there is evidence that participants believe there is an expectation that they will use evidence in this way (this will be discussed in more detail in chapter 8). The example above may demonstrate a case where the participant has encountered an individual from a different context of politics or governance, where the same norms around use of evidence may not exist. It has been suggested that norms belong to specific groups or individuals, and these may at times conflict with the norms of others (O'Neill, 2013). Use of and respect for evidence has been specifically mentioned as a norm which has become widely accepted in the last 20 years (O'Neill, 2013). However, based on the interview data above, it would appear that such acceptance is not widespread to the extent that all individuals encountered by the participants in this research share the same norms.

The family of codes grouped together under the selective code 'Experiences of external perceptions of information' were therefore brought together because they all illustrated the importance of other people's views. It appeared that participants had experienced difficulty in



dealing with differing views held by different sets of people, arising in situations where they may be required to present those people with evidence. There was also data to suggest that shared views of evidence facilitated and smoothed the path of participants' use of evidence in their working lives. In either case, it appeared that the perceptions and views of others might be just as important in understanding how participants interact with information as it is to understand the perceptions and thoughts of the participants themselves.

## **7.5 Integration and evaluation of information**

The data grouped within the open and selective codes discussed in sections 7.3 and 7.4 has indicated that participants experience some distinctions between subjective information and objective information, and also that individual perceptions of information are important in participant's interactions with information – both their own perceptions, and what they thought the perceptions of others would be.

Clearly each individual has their own knowledge and perception of the world, with information that they encounter a feature of that world. However, despite the individual nature of interpretations and perceptions, could there be some shared mechanisms or frameworks through which participants make sense of information for use in specific situations or cases? The codes discussed in sections 7.3 and 7.4 have addressed participants' ideas about information on a general level and have examined what participants thought that people around them thought about information. The interview data also provided insight into elements of information, which seemed to come into play when participants were confronted with a specific piece of information and intended to or thought about using it for a specific purpose. Open codes which contributed to gaining an understanding of how participants related to information in such circumstances were: 'Checking a specific source', 'Expert information and witness', 'It's good to have the authority', 'Evaluating information', 'Constructing options for moving forward', 'Verifying and cross checking information' and 'We weren't going to have all the answers'. These codes

were organised under a selective code 'Integration and evaluation of information' as shown in the table below:

**Table 7-3 Open codes forming the selective code 'Integration and evaluation of information'**

Selective code	Open codes
Integration and evaluation of information	<ul style="list-style-type: none"> <li>• Checking a specific source</li> <li>• Expert information and witness</li> <li>• It's good to have the authority</li> <li>• Evaluating information</li> <li>• Constructing options for moving forward</li> <li>• Verifying and cross checking information</li> <li>• We weren't going to have all the answers</li> </ul>

In terms of understanding how participants interacted with specific pieces of information, two open codes, 'Evaluating information', and 'I need information to be presented in a way that is useful to me' were useful. 'Evaluating information' described participants seeming assessments of information, both during the think aloud exercises and during any instances where they passed opinions or judgements on information that arose in the day to day activities described in the earlier part of the interview. The quotations organised under this code all included occasions where participants seemed to be trying to determine whether or not they should believe what they were reading. This included thinking about who had written the information, whether it 'rang true', whether it was clear, or whether concepts or terms referred to were clearly defined. Similarly, quotations which came to be organised under 'I need evidence to be presented in a way that is useful to me' organised instances where participants commented on something that they required more detail on, such as where information had come from, or how things were defined. Example quotations include:

*"Er, yeah, I don't know whether, I don't know what they mean by the word generations in there. I don't know whether they mean different cohorts or whether they mean different age groups... I don't know."* (P3)

*“Yeah, I think, so I mean it is an interesting, the findings are interesting, um some of it I guess is subjective, it doesn’t say you know, how do they assess controlling, and that might be different between different types of children and family situations...” (P6)*

A slightly different example from the code ‘I need information to be presented in a way that’s useful’ came from Participant 4. Participant 4 seemingly had a clear idea that they needed to find an informant for their work who was drawn from a nationally focused organisation, and would be able to speak at a level that those less familiar with the topic at hand could still understand:

*“Er, and so it was a question of finding out who might be able to help us with this. So there was a process of actually trying to seek someone who could come to that meeting or speak at that meeting to advise us. We’ve been working with [...] whether they might be able to help us, but they felt that they work more on the international perspective rather than the national perspective. We’re a national focused organisation, so that sort of ruled out, but they then did sort of start suggesting some other people, people from the [...], and I then talked with my management committee, and they felt that that might be too highbrow.” (P4)*

In the first two quotations above, the participants 3 and 6 seemed to concentrate on what they could not discern from the information given. There were a number of similar instances where participants articulated a desire for additional or more complete information e.g. to know how something mentioned in the article had been defined, or to know what type of population had been involved in the research. Participants also seemed to consider other characteristics of information – if figures or statistics had been used was there a reference for their original source? If the article reported on research, who had carried out that research? Had the participant heard of them? These seemed to be elements that participants used to judge how ‘good’ the information provided was – words like credibility, reliability and validity were used. Presentation as referred to in this code was understood to describe both the format and content of information. There were also hints that the purpose

behind this evaluative approach might be to determine whether information represented the 'truth'. These hints which came from Participants 3, 4, 6 and 7, who referred to 'truth' and 'facts' and 'bias' and 'subjectivity' of the information presented. Participant 12 mentioned considering what the 'angle' of the people providing some of the information might be. Participant 9 referred to something that they said 'could not be argued with', and participant 11 referred to the possibility that information could be 'wrong'. Decisions about whether information represented the truth might be reached by considering whether it had been produced by organisations that sounded reputable or whether it fit with what participants thought they already knew. On the other hand, participant 4's quotation highlights a need to have information provided in the correct form – whether this be form in terms of the level of detail or form in terms of lay out and presentation. The uniting factor between these quotations is the desire to derive certain things from the information at hand, which could include understanding or actions. Participants seem to already have in mind what benefits or purpose they want to gain from the information, and it is easier for them to derive this benefit if the information is presented in a way that facilitates their interaction with it. The link between the codes 'Evaluating information' and 'I need evidence to be presented in a way that is useful to me' is suggested because both codes highlight how participants go about making meaning when interacting with specific pieces of information in specific situations.

Another element to how participants go about the process of making up their minds about specific pieces of information came from the open code 'It's always good to have the authority'. This code developed from the usage of 'authority' and 'authoritative' in relation to information in some of the earliest interviews. The coding criteria gradually developed to include broader references to positive attributes of information, such as references to credibility, quality, repute or validity. The underlying idea that brought together the data organised under 'It's good to have the authority' was that the information could possess a positive characteristic of authority or credibility, and that this was important. This code helped to attach a more formal definition to what participants were searching for when

evaluating information, and there was some overlap in the data between 'Evaluating information' and 'It's good to have the authority'. Selected examples of quotations from 'It's good to have the authority' include:

*"The, er, Scholar, I ended up at some point reading some information about [...], and then found something on the CDC website because I know CDC, the Center for Disease Control, I thought that's starting to be a bit more authoritative, so I thought, who in authority is saying what." (P1)*

*"Yes, you know and it says Kings College London, oh, it says University College London there, and it says Kings College under the table, but you presume they're all collaborating...you see yes, it's things like that that give it credibility, you see it's published in a journal and it's the BBC reporting it, not the Daily Express." (P4)*

At times there was an element of sense-checking to participant's reading of information, for example:

*"Sensible recommendation that parenting interventions should be aimed at both parents, not just the primary caregiver, er, and they talk about caveats need to be applied to the results." (P6)*

*"[...] so that's probably reflective again of this stat that's used, so only 1% of packed lunches meet nutritional standards. How - I realise it's a news story but how have they calculated that?" (P7)*

*"The signatories include Professor Lord Darzhi of Denholm', well he's pretty much a chap I'd listen to, you know, he knows his onions, um [reading from article] 'Professor Sheila the Baroness Hollins described childhood obesity as one of the biggest public health threats faced by the nation'. Yeah, I think there's no arguing with that." (P9)*

What did it mean for information to be authoritative or credible? One answer is suggested by inferences discussed earlier in the chapter – that participants are seeking factual

information. An authoritative view might be a definitive view, something that resolves or reduces uncertainty. In some places, the data suggested that something might be regarded as authoritative or valid by virtue of the organisation that had produced it, e.g. if a University was the source, the information might be reputable. At times there seemed to be a general assumption that certain producers of information were 'preferable', e.g. participants mentioned the WHO or CDC in a way that presumed that they were reliable sources. Some participants used phrases such as 'good evidence' or feeling 'confident' in information. 'It's good to have the authority' was also used to organise examples of the reverse— where participants pointed out things that they appeared to question or be slightly concerned about – lack of citation and referencing for information for instance, or outrageous headlines. The underlying idea, the reason why the participants are considering authority, validity, and reputability etc. is to determine whether the information reflects the 'truth'.

Another element to the drive for authority in dealings with information appeared to lie in activities of cross-checking and verification that participants referred to. Instances of this were organised under the code 'Cross checking and verification', which as the name suggests, revolved around participant's attempts to ensure that the information they had was 'correct':

*"[...] I then decided to do a quick look of [...] just to do essentially a cross check to, for instance verify that all of those [...] are also for instance [...] which is one of the groups that replied. So just to confirm that, partly for my own peace of mind, but also so that we could document for methodology purposes that, yes, all these [...] are members of [...]. So, that was also recorded just as kind of a double check." (P2)*

*"I started giving a summary I guess of the study itself and why we did and what our findings are, so what our current thinking is, you know where to take it next. So that was kind of, quite a brief summary [...] and then they were in little groups, so I kind of set group questions for them [...] so they were for example, what did you make of our findings [...] did we get it right?" (P11)*

The link between these examples, and the other open codes discussed earlier in this section is the idea of 'right' - that information can be right in the sense of being a true representation of reality. The examples organised under the code for 'Cross checking and verification' differed slightly because they showcased a particular kind of behaviour with information – going back and checking information that participants had created or collated themselves. Effectively participants seemed to be checking that their thinking or syntheses of information were 'right' before proceeding with their task. So, it appeared that, taking these different codes together, the idea of 'truth' was important throughout. Participants might read a piece of information and question how likely it was to be 'true' or they might consider information produced as a result of their own activities and consider how likely it was to be 'true' or 'correct'. However, there was another element to this data, which was derived by considering the purpose of this cross checking. Some of the data hinted at this - Participant 2 referred to documenting information for methodology purposes, and Participant 11 implied presenting findings to other people, asking them if they thought they were correct. In both cases there is a suggestion of scrutiny by others.

There were also instances where participants mentioned going to a specific defined source for whatever information they needed to complete their task. These sources could include both organisations and individual experts or expert groups. These examples were organised under the open codes 'Checking a specific source' and 'Expert information and witness'.

Selected quotations from these codes include:

*“My next tactic was to ask [...], so going for someone one considers to be an expert,[...], who said, well, on the [...] website, here's what they say, and I think he pointed me towards one other UK source of information.”. (P1)*

*“So, I essentially had a general sense of, kind of, the big activities and events that I was going to use as the anchor, so it was...let's see, so the [...] were one of them, and there's, [...] is really good about maintaining archives of lists of organisations*

*who have engaged in consultations responses and things like that, which are for the most part freely available on their website.” (P2)*

*“Er, the data for [...] as I said was [...], which as I said was published in the Lancet, last year for [...], and we were aware of that. We have anyway collated data of our own, but in this case because they’d done a consistent method applied to every country in the world we’ve gone along with their data because it’s a good a guess as anyone’s is going to be, so we’ll use their data.” (P14)*

It seemed that participants had a preference for sources that they regarded in a certain light – as ‘good’. A telling point in the data organised by the code ‘Expert information and witness’ was that there seemed to be differences of opinion as to the role of experts and information provided by them – essentially the question was, could this information be relied upon, was it regarded as evidence?

*“The evidence is also to me, is presented very much as quotes from people with Dr or Professor in front of their name rather than I guess actual study material. Er, you know, they’re given their eminence I guess by the fact that they’ve got a, you know they’re Dr or professor and where they’re from, so Royal College of Paediatricians and Child Health, [...]” (P5)*

*“One interesting thing that I’ve come across which tallies with my day to day experience is for instance um, the cabinet office back in 2000, maybe 1999, produced a report for policy makers on the sorts of things that they should consider as evidence in developing policy, and they counted everything, not just scientific journals, but consultations, expert information and witness, you know the experiences of practitioners. They were encouraged to consider all those different types of information in, as evidence in terms of informing policy development.” (P6)*

In some cases, as with participant 5 above, experts as a source of evidence seemed to be treated with suspicion. However, participant 6 seems to present an alternate view, regarding



expert witness as valid evidence. The code for 'Expert information & witness' was not just about perceptions of expert testimony as evidence or otherwise. It also encapsulated some of the other roles that experts might play, and elements of what made someone an expert. For example (bold highlights are the author's emphasis):

*"So I'm more inclined to look at evidence that's produced by academics, that [...] report was produced by [...], a **well renowned academic** in [...], but for the [...] community for policy makers, to influence policy, and so the way it was summarised and presented was in a very accessible way to me." (P6)*

*"And also as long as it's done by **credible scientists**, then, I let them do the hard work of the searching in Medline and reading through hundreds of thousands of research articles, which I actually find quite boring. So yeah, I'd rather they did that because that's what they do and enjoy and synthesise in a way that I can then use it to influence policy." (P6)*

*"The letter signed by 40 **leading** health professionals', so yeah, I would say that, that strikes me that they probably know what they're talking about. Which would reassure me that this article isn't just three doctors with an opinion." (P9)*

The three quotations above all seemed to have something in common, as they mention real or hypothetical individuals who might be responsible for producing something that might be used or seen as evidence. In each case, although the word 'expert' had not explicitly been used to describe these individuals, certain other descriptors which were interpreted as having similar meaning were used, i.e. 'renowned', 'credible', 'leading' professionals. In each case the sense was that these individuals were people that by reason of these attributes were well regarded by participants. The use of similar adjectives to those seen in the codes for 'Evaluating information', and 'It's good to have the authority' provides a link between these codes and 'Expert information and witness'. An expert is usually thought of as an individual, although organisations may also be referred to as 'expert centres'. While

'Evaluating information' and 'It's good to have the authority' mainly dealt with organisations or documented sources of information, 'Expert information and witness' is more focused on people as a source. However, the underlying characteristic of the reliability of information, whether it comes from a document or a person, appears consistent.

The code 'We weren't going to have all the answers' highlighted an element of uncertainty in the way in which participants interacted with information. There are examples of this uncertainty coming through both from the situations participants described and the think aloud exercises:

*"I suppose I'd say that I tried to find out, er, by my own and I wouldn't call them particularly exact methods, popping something into Google Scholar gets you half way down the line, it wasn't systematic, but it did begin to answer a question. When the answer wasn't clear, then I wanted to see if there was an understanding or consensus, and if nothing else it shows me that there isn't a huge amount of understanding, there's not a huge amount of consensus." (P1)*

*"These high level, I mean for something like that, the high level facts and figures...I guess the only issue was, I think the reports I pulled up were something like 2012, 2013, so it's not always easy to know whether that is the latest. I mean some of these things are done annually, and even if they're done annually sometimes it takes a year or two. So I guess that's the only outstanding thing I wasn't entirely sure." (P3)*

*"So, I think there was a point at which I was probably thinking 'Oh gosh, I really do have to understand all this complexity', but then realising that actually that wasn't going to be possible and that wasn't the point, and you can spend years on trying to become, you know, the expert, when there are actually experts out there. So it's more about...making sure that we can have a reasonable ask, but without necessarily having all the answers ourselves." (P4)*

Firstly, this data indicates that it is quite common for participants to be confronted with uncertainty when interacting with information. In fact, it almost appears that part of their interaction with information is to identify areas where there is uncertainty – this has been discussed with reference to other open codes 'Facts and truth' and 'Evaluating information'. This process seemed to be conceptually similar to the way in which participants evaluated information to determine its objectivity and authority, or truth value. Taking some of the quotations from the think aloud exercise as an example, participants often looked at the information provided and questioned aspects of it such as how things have been defined, who has been involved or included, where information has come from, who has been responsible for producing it, or when things are supposed to happen. There is a sense of wanting this information, of wanting more information than is presented in the written news stories used in that part of the interviews. The reason why this information would be useful to participants is not very clearly stated, but it is possible to speculate. Some participants mention wanting to use the information in their work, or refer to things that they would like to know if they went on to use that information in their work. Therefore, this could imply that those additional pieces of missing information might be helpful to the participant in determining how relevant the information is to them, and potentially also how reliable the information is likely to be. There is also a link to the concept of authority. It may be that by this process of questioning information, participants are signifying that they are not willing to accept information as authoritative – they will not just take it on trust, they need to ask more questions in order to satisfy themselves as to potential problems associated with information and/or its likely veracity.

There are also day to day situations where participants encounter uncertainty with regard to information. Uncertainty is not necessarily the result of not being able to find any information at all – it can be because information has been found, but there is a conflict or discrepancy. This highlights that more information is not always enough to answer questions – sometimes it can generate further questions. There are also situations where participants have been

happy with what they have found, or at least felt able to accept a certain level of uncertainty. There may be problematic uncertainties where participants need but feel unable to establish the importance of an issue or the degree of effect something is having. There may be less problematic uncertainties where participants feel able to establish the importance of something in a reasonable way, but are unable to provide answers as to what to do about this. Whether or not an uncertainty is acceptable may depend in part on what the participants are trying to achieve. It may be that they do not see it as their role to determine a course of action if they have been able to find sufficient information to highlight the existence of a problem.

The open code 'Constructing options for moving forward' was about recognising possibilities through the use of information. This related to the idea of predicting consequences of a decision but concentrated on understanding the possibilities for how to go about something as well as what the potential outcomes might be. This code was connected to the idea of predicting consequences of a decision.

*"I suppose the sort of the knowledge bit of that [...] is how do we go about understanding what our, getting to the point where we can have a policy ask. So it was about understanding [...] policy, and where we could sort of, fit into that more [...]." (P4)*

*"so we were doing some marking quite a difficult project, [...] we were debating whether it would get a one, which would mean it would fail, or a two which mean it would, it would just pass, and part of our consideration [...] was, what might the consequences lead to. Er, and that maybe sounds a bit...not like you would say, oh well we're not going to do that because that's going to happen, but just a sense that, you know, you have to be quite justified in what you're doing." (P5)*

*"[...] they're approaching things very differently to us, and they were more, they were further along than we were, so it was very helpful to speak to the head of the unit and*

*learn from their mistakes or learn what went well for them so that we could apply it”*

(P7)

Participant 4 for example wanted to understand how to go about fitting a new issue into their policy ask. Participant 5, specifically stated that although they sought information on potential outcomes of a decision, that information was not the sole basis for their eventual decision. They also found it useful to be able to understand and present the range of potential outcomes – so it is the options element that is more important here than the outcomes themselves. There was also a learning element to this understanding of options which came from participant 7’s interview. Participant 7 referred to learning from others about what could happen during a task and thinking about how to apply that to their own situation. ‘Constructing options for moving forward’ was about using information to make an informed decision, recognising that an informed decision is not just about understanding the consequences of one course of action, it is also about understanding other possibilities.

While the two selective codes discussed in sections 7.3 (Personal experience, knowledge and perception of information) and 7.4 (Experience of external perceptions of information) highlighted the importance of the distinction between subjective and objective information, and the tensions that sometimes arise from this, ‘Evaluation and integration of information’ focused on the criteria by which participants consider information. As well as determining whether information is objective or subjective, and having views on the relative importance of these types of information, participants also go through a further process of judgement of information. This process involves considering the quality of information – whether it is authoritative or credible.

The various codes grouped within ‘Evaluation and integration of information’ highlighted some of the concepts or criteria that participants seem to reference when interacting with information. While the selective codes ‘Personal experience, knowledge and perception of information’ and ‘Experience of external perceptions of information’ provide insight into how information is perceived and the impact that experience of encountering different perceptions

has on this, 'Evaluation and integration of information' suggests how these perceptions are used and conceptualised with regard to specific forms of information. Objectivity and subjectivity remain important as ways of thinking about information but can be linked to more specific concepts such as authority.

## 7.6 Influence

A third cluster of open codes developed around the idea of the context of participants' interactions with information, and what they were seeking to achieve. The selective code under which this cluster was created was labelled 'Influence'. The open codes grouped within 'Influence' were: 'Decision making', 'Looking for consequences', and 'You have to have an audit trail of evidence', as shown in the table below:

**Table 7-4 Open codes forming the selective code 'Influence'.**

Selective code	Open codes
Influence	<ul style="list-style-type: none"> <li>• Decision making</li> <li>• Looking for consequences</li> <li>• You have to have an audit trail of evidence</li> </ul>

'You have to have an audit trail of evidence' developed fairly early in the analysis. Selected examples of quotations which were ordered under this code include:

*"Second thing I want to say is that I want to justify focusing on a high income European country, which needs a bit of justification when you're working in public health, because obviously we aren't the countries with the biggest health problems. So then I wanted to find some evidence that said actually, where [...] is concerned, there is a serious problem in high income European countries such as the UK." (P3)*

*"Er, and then the other one, the POST one, I think that was more just setting out the scene in terms of you know, the different headings and categorisations of the*

*problem, why it was a problem, what the evidence was, what kind of health outcomes were being affected, um, and what the recommended intakes were and therefore what kind of actions again could help.” (P6)*

*“So a couple of years ago we commissioned a review, a piece of desk research into looking at what evidence there is for how [...] organisations have an impact on public health.” (P10)*

*“[...] every recommendation that you make you have to have an audit trail of the evidence. So you can’t just make a recommendation without attributing the evidence to make that statement.” (P13)*

This code was initially taken at face value during analysis, and the above examples are illustrative of this. ‘You have to have an audit trail of evidence’ grouped anything which involved participants saying that they needed to use evidence as back-up to arguments, statements and recommendations, wherever the specific term ‘evidence’ had been used. What began to emerge from the process of coding these extracts and thinking about the kind of interaction with information that the participants comments described was the underlying application of information for the purpose of rationalisation or justification. This seemed to be the overarching activity that usage of ‘evidence’ signified. As a result, this open code was then used to order quotations where similar interactions - uses of information for the purposes of justification - were implied or described even if the term evidence had not specifically been used. Examples of such quotations include:

*“I’ve been interested in [...] advocacy. I was particularly intrigued that [...] didn’t appear to have much of a mention in [...]. So the first question that I was trying to answer was, what is the potential prevalence of [...]? I was doing that principally so that I could first of all feed into some WHO recommendations on [...] with a view to reducing harms and the list of harms was given, and I was saying, you know what, I need to put in [...].” (P1)*

*"So I was trying to get to grips with, maybe it's not thought about because it's not actually a huge cost to society, it may be a very hurtful and harmful disease for the individual and the family concerned, but I guess if you're saying in the balance of things it is important or not you need to be able to say what's the impact on society."*

(P1)

*"Um, I suppose it would be nice if there was a sort of a source of knowledge which was, you know had already done it, you know if you could sort of pick one off the shelf, but you know, that's what I suppose we're trying to do on behalf of other people in a way. You know, we're trying to do that and say to people, here's one that we've done earlier, use this in your policy asks. So, and I suppose what that says to me is that [...], if this isn't already kind of clearly spelled out, that there is a value in doing that, not just for ourselves but for others too."* (P4)

A summary of the initial interpretation of 'You have to have an audit trail of evidence' was that information is experienced as evidence when used for the justification of a proposition. However, there is more to this way of experiencing information. For one thing, the level of importance attached to 'evidence' was notable. Although emotional reactions to information were not a specific focus of the research, it was noted that at times participants hinted at emotional reactions around uses of information. Participants might feel uncomfortable when lacking evidence or more confident because they had it. Attempts to explain these reactions included suggestions that participants felt uncomfortable when not using evidence because they had failed to meet what they thought their employers, or their wider peers' expectations were. Another source of discomfort could be that they were worried in case they were wrong in their statement of the importance of the condition. It was the second of these ideas, the idea of being 'wrong' that eventually came to be more important to the analysis. The association between evidence and justification was important to this, because experience of information as evidence implied a need to be able to discover and show facts about the world – to be able to state a proposition and be confident that it reflects reality. Once looked



for, echoes of this need to be able to use information to reflect reality can be seen in some of the above quotes.

There was a strong element in the data which described using information in decision making. The term 'decision' appeared fairly often in interviews, giving rise to an open code for 'decision making'. 'Decision making' was used to group any data that related to actively deciding to do something, with a decision defined as a deliberate, intentional completion of an act or actions. The data suggested that there may be several subtly different functions of information in supporting or influencing decision making. The first and most obvious is a kind of rational decision making use of information. For example, participants referred to using information to help decide what course of action to take, or what recommendation to make:

*“helpful in that it... it will...support, sort of just provide further backing and support to the next steps of the project and show that, you know, we wouldn't have picked, um, the [...] just because, but that both its [...] so sort of a cross reference to say, this is why, because there may be, as part of this project, there may be some interviews done, so that was one of the reasons to do the scoping was to figure out, well to help with the decision process around who to interview [...].” (P2)*

*“We've put in the research recommendations and because I'm involved with [...] I know they systematically go through it, and then they call for proposals. The system works – [...] is about the only place that does that. So you know, they're picked up systematically, and things like Cochrane Collaborations and the rest of it. So they're a very good basis for things like deciding what the research agenda should be. So those would be definite outcomes.” (P13)*

Alongside this initial purpose of choosing between options, the expectation of future scrutiny of decisions exists. Information also has a function for showing other people why you made a decision, and showing that the decision you made had a basis other than your own

opinion, and that it was a reasonable or right decision. In such circumstances, an appearance of decision making based only on subjective personal factors is to be avoided.

Another, subtly different function that participants seemed to derive from information when using it in relation to making decisions may relate to acceptance of those decisions - both for themselves as the decision-maker, and for those who will be affected by the decision. It was the apparent expectation of interaction and communication with other people which drew the open code 'Decision making' together with 'You have to have an audit trail of evidence' to form the selective code of 'Influence'. Both codes suggest a use of information to promote agreement, acceptance and adherence with actions and decisions made or suggested by participants – conceptually understood as contributing to efforts by participants to influence these others.

Participant 5 presented an example of this, as they referred to information informing feedback, but not necessarily being a deciding factor (see section 7.5). 'Informing' in this scenario may have meant that the information was passed on to the person being affected by the decision, to help that person to better understand the consequences of that decision. Interestingly the participant makes a comment suggesting that they had to divorce themselves from those consequences to some degree, perhaps because an objective decision had to be made, but at the same time they could pass information on because it might help with acceptance of the decision.

A final function of information in supporting decisions is through an informative method rather than as something that directly guides choice. Participant 10 described an example where it seemed that they wanted to make it clear that they were not trying to overtly influence decisions, perhaps because they didn't feel comfortable with doing that. Instead they had prepared information as informative background to help other people reach their own decisions and conclusions. There is a subtle shifting of responsibility here – while the example was about presenting information in a scenario where you hope it might help someone make a decision, the desire to influence others in a specific direction is not

present. It's a case of giving information to someone else and suggesting that they use it as they see fit.

*“We thought it would be a good idea to have someone who was an [...] expert involved and have a practical example of a specific way of working, because our guidance was definitely not, do this, do this, do this, it was more these are the sorts of things you need to think about, it depends what you're doing, you decide. So we wanted to have a kind of concrete example of one approach.” (P10)*

The intent to influence is still apparent but is more general – the participant seems to be seeking to promote a general acceptance of the importance of an idea, rather than a specific course of action as a result of this acceptance. There is a sense of separating oneself from the information and the decision, with participants distancing themselves from the final decision, and almost using information as a tool to achieve that. The deliberate attempt to avoid suggestion of direct actions to the person making the decision differentiated this circumstance from the rational evidence-based use which some participants described. It also added detail to the developing conceptualisation of 'Influence'. More rational and direct applications of evidence for decision making would include participant 1 who described looking for information to use to support a proposal to include particular public health harms in a set of recommendations they were feeding into:

*“I had already said to [...], you ought to [...] include [...]...and at that point I wanted to say to myself, yeah that's a reasonable line to take but where in the scale of harms would you place it. So I needed to, I felt uncomfortable having said it without having some good evidence to back it up” (P1)*

In this case, participant 1 seems to be hoping to influence those they are interacting with to include something additional in their scope – there is a specific change of outcome that they hope will occur as a result of this intervention. For participant 10, the situation is not about

using influence to secure a specific result – it's an effort to present information and leave final decisions up to others.

There may also be different forms of decision making encountered by participants – active vs. passive. For instance, participant 2 describes what sounds like an active choice – selecting candidates for interview (see above). Participant 7 however describes having a decision made for them, in effect saying that information which could have helped to realise a limiting of the options which they had to choose between in their task.

*“[...] so the reason we were so keen to find out what was going on [...] was because the group are at very, very early stages or you know, exploring what a possible coalition could be, and one of the questions that we therefore need to ask ourselves is, what is, what's our scope, do we want to do UK wide, do we want to do just England? And therefore if there was a group forming in [...] it might make our decision for us.” (P7)*

Rather than actively choosing from several options, all of which were equally open to them, the participants' colleagues could by definition have been forced down a particular path, with information being the guide which closed off the other options. The decision making on the part of participants is effectively passive, and out of their hands.

Although the use of information as a rational item in decision making does occur, it also appears that non-rational information affects decision making. For example participant 8 talks about the importance of information about what people's preferences are (see below). Assuming that people's preferences are subjective and unique to each individual, these preferences are not necessarily rational.

*“So, what you get is you can have rational evidence, but at the same time actually one of the big players, and this exerts its pressure on local politicians is culturally what people actually feel would make a nice environment where they live. [...] that's*

*actually the nature of and the joy of evidence, you know it's all those different things. And it comes back actually to my [...] example.” (P8)*

This can feed into decision making as a counterbalance against the possible more objective, rational evidence. This highlights that although decision making is a process, it isn't necessarily fully wedded to rational/objective information. Sometimes more subjective elements, such as people's wishes, need to be taken into account. There can be multiple inputs of information into making a decision, and these inputs may modify decisions. It's also important to take into account the ideas of the decision makers themselves. Participant 12 comments on what appears to be a lack of rational decision making, where decision makers are apparently influenced by their own biases:

*“And, to me the kind of overwhelming issue that often evidence is overwhelmingly ignored by decision makers [...] the extent to which the evidence is ignored is quite staggering. [...] there's the kind of wilful ignoring of evidence where it doesn't fit an ideological frame, almost its considered to be inconvenient.” (P12)*

Another open code, 'Looking for consequences' focused on what appeared to be participant's efforts to determine consequences or results of actions through the medium of information. 'Looking for consequences' highlighted the inclination of participants to approach information from a particular perspective, i.e. analysing its ability to indicate specific consequences of specific actions, or to establish cause and effect relationships between phenomena. There was some overlap between the quotations coded under this label and those organised under 'You have to have an audit trail of evidence'. Selected examples from the code for 'Looking for consequences' are given below:

*“No, I mean we just, the course director, I mean we just assume that she knows, and yeah, she was able to give quite a quick and clear response as to what the consequences would be. (P5)*

*“Yeah, that’s right, so they are producing a brief where they want to review the evidence on [...], erm and summarise that evidence in a way that’s useful for policy makers [...] what’s more interesting is actually what then needs to happen, as a result of finding that the evidence says x, y and z.” (P6)*

*“Ok, yeah, there’s the evidence based public health but there’s also the evidence based implementation [...] Most of the change is about informing the policy makers to make this change or invest in this area. And there are 2 things you need. One is evidence of the benefit, evidence of the effectiveness of the intervention to achieve that benefit.” (P13)*

The quotes from participants 6 and 13 are useful in highlighting the connection between understanding the consequences of an action and influencing others. The existence of this connection was the reason for the decision to group this open code as part of the selective code ‘Influence’. Both examples show participants intending to persuade others to make changes or decisions about issues of interest. In effect, ‘Looking for consequences’ adds further detail to the understanding of how participants use information to influence decision making, by helping to conceptualise the kind of information needed for that purpose.

Another point of interest in the code ‘Looking for consequences’ was that it cut across situations where participants were attempting to influence the development of policy recommendations and more administrative situations where influence of others to a course of action seemed absent. Participants 6 and 13 above represented examples of activities that were intended to influence policy, while participant 5 described an administrative situation related to a decision on marking. Nevertheless, these experiences were united by the application of information to attempt to determine or predict an outcome. In some cases this link between information and occurrences in the physical world took the form of cause and effect relationships – for example where participants sought to establish a link between a risk factor and a disease. In other cases the link was to suggest a hypothetical outcome, in scenarios where a course of action or recommendation was proposed. In either case the

participants seemed to be trying to link together events through information. Participant 6 above summarises this by presenting examples of both connections in one quotation. Firstly, evidence is suggested as showing a relationship between a certain health behaviour as a risk factor for a disease, and secondly it is used to suggest appropriate actions to mitigate this risk. This also suggests the reasoning for grouping this experience of seeking consequences and attempting to understand cause and effect alongside the need for an audit trail of evidence. As shown by participants 6 and 13 above, the term 'evidence' was sometimes used to describe this particular way of using information. This may help to understand the necessity of evidence hinted at by the data organised by the open code 'You have to have an audit trail of evidence'. As participant 13 is quoted as saying above, you can't make a recommendation without having something (evidence) to highlight what you think the outcome of that recommendation will be.

The open codes 'You have to have an audit trail of evidence', 'Decision making' and 'Looking for consequences' share a focus on the need to use information as evidence, justification or rationale. They differ from many of the open codes discussed earlier in this chapter in that as well as providing some data on how participants perceive and think about information, they also provide an insight into what participants do with information, or what they anticipate doing with it and how their interactions with information help them navigate through situations. 'Looking for consequences' highlights the multiple forms in which the idea of cause and effect can appear during the participants' interactions with information. These include examples such as risk factors and resultant diseases, as well as administrative decision-making situations, where the question is, 'What consequences will my actions here have for this person?'.

This trio of open codes exists in the context of communication with others. Many of the quotations organised under these open codes refer to participants' intent to interact with others. For instance the participants may talk about liaising with policy makers, or mention dealing with other colleagues or individuals. Their words also indicate that these

communications are of a particular kind, describing presentation of arguments, or suggestion of recommendations or courses of action. On a conceptual level, the intent behind these forms of communication is understood to be to influence other people. Often, but not always, these others are referred to as 'policy makers' – however they may also include colleagues and other individuals that the participants come into contact with. Some participants may also refer to 'decision makers', and this term has been interpreted as being synonymous with 'policy makers'.

However, pointing out that participants often have intent to use information to communicate in what is essentially a persuasive, influential way with a range of other parties, indicates that on some level, we are all decision makers. Influence is not just about attempts to persuade those in positions of organisational, societal or political power to do something – it can also relate to attempts to influence the thinking of other people whom we perceive as being closer to our own level, or even on a lower level in terms of power in given situations. We all have the ability to decide what we believe and what we think about different issues, and we can all decide to change our thinking and adopt new ideas – usually as a result of interactions with other people's thoughts and ideas. Participants 1 and 4 are examples of this, as both sought to influence the thinking of their direct colleagues, in order to promote and spread their own ideas of what was important.

## **7.7 Paths to influence**

The previous selective code for 'Influence' made clear that there was a strong interactive element to participants' dealings with information. In many of the scenarios related by the participants, the data indicates conscious use of information as evidence in an environment where scrutiny is expected. The very idea of information as evidence in itself seems to suggest this, as evidence is taken to mean the application of information to provide back up or support for an argument or a suggested course of action. There must be another individual involved in each case who will be the recipient and potential scrutiniser of that argument and its supporting evidence. The interview data included a number of examples of



such activities or tasks. Several open codes had developed which seemed to represent this: 'Trying to make a case', 'Framing an issue', 'In order to get some headlines' and 'How do we make sure everyone is on the same page'. These four open codes were brought together to form the final selective code, 'Paths to influence', as shown in the table below:

**Table 7-5 Open codes forming the selective code 'Paths to influence'.**

Selective code	Open codes
Paths to influence	<ul style="list-style-type: none"> <li>• Trying to make a case</li> <li>• Framing an issue</li> <li>• In order to get some headlines</li> <li>• How do we make sure everyone is on the same page</li> </ul>

The first of these open codes, 'Trying to make a case' was used to organise data where participants talked about using information to support an argument which was being presented to another person. The code in itself is fairly broad in that the 'case' or 'argument' being made did not have to extend as far as arguing for a course of action or for something to change (although this did occur in several cases). This meant that the code was also used for examples where participants had been seeking simply to argue the facts or truth about a certain aspect of the world, without necessarily suggesting doing anything specific about it. This could include an argument that something was important or that something had already occurred if there was a chance that that occurrence would not automatically be accepted by others as a fact. The content of the argument in and of itself was not therefore the defining feature of the data belonging to this code. Rather, it was the interactive nature of these behaviours that were important. To qualify as 'Trying to make a case', data had to indicate an intent or action to influence another person or persons through a specific instance of use of information to achieve that. Basically, there had to be someone, somewhere, even if it was an as yet hypothetical and unknown person, that the participant sought to influence with

their use of information to build a case. Selected examples of references to this kind of activity include:

*“So what they would like to do is produce a review of the evidence linking [...]. And so they asked, if- I’m on their, this steering committee as a representative from [...], and also having been involved in work on [...] prevention. So we had our first call on Monday, um and, were, kind of talking about the scope, who the target audience for the briefing was going to be etc., and one of the things I, they asked me to do, because I work in [...] was to provide some examples of [...]. Which, you know kind of, are the sorts of things that policy makers might find useful.” (P6)*

*“Yeah, one of the other things was that – this particular [...] is not the only one in the city that has been included in this [...]. So we established contact with [...], and they also wrote letters because they were just as affected.[...] So in terms of...no, I’d say, I don’t think we tried any other tactics. Er...I think it was letters to them, contacting the [...].” (P8)*

*“So, the actual written stuff was a combination of these are the questions that you really need to think about if you want to [...]. First of all, a kind of why should you bother in the first place, and then what were some important questions to think about, which I’d got from some existing sources. And then a kind of, and these are the things we think are distinctive to [...] and you should have a think about how you might want it capture your work under these headings as well, and here some examples of places where it has already been done.” (P10)*

Using information in any form, and transmitting, or intending to transmit it to another person with the aim of influencing that person sums up the idea of ‘Trying to make a case’. This code is closely related to the conceptualisation of ‘influence’, and it could be argued that it belongs with the previous selective code described in section 7.6. However, the existence of a number of other strategies for the application of information to achieve influence – those

discussed in the remainder of this section – provides an alternative home for this open code. The code is placed under this separate selective code ‘Paths to influence’ separating out this data as a way of increasing the detail in understanding of what participants actually do with information when attempting to influence others.

The code ‘Trying to build a case’ also organised instances where participants had been party to an argument that someone else had made to them, and more general references to the idea of using information to support an argument, for example:

*“I suppose the other thing you see, and again it relates back to I suppose, I get a bit worried about all of those sorts of things, I mean I’ve actually spoken to, of course you’ll know [...] won’t you? So I’ve spoken to [...] about [...], so I sort of think, oh you know I had an argument with [...] about [...], and actually, curse him, he had quite a good line on why it was a good thing.” (P8)*

The interaction and influence elements of the activity of making a case gave this data common ground with those organised under ‘Framing an issue’ and ‘In order to get some headlines’, two other open codes grouped within the selective code ‘Paths to influence’.

‘In order to get some headlines’ represented an element of provocation or attention grabbing that occasionally occurred in some participants accounts of their interactions with information. This element arose from interviews with P1, P12 and P14. Selected examples of this element from the interviews include:

*“[...] my hope is, you can see its probably twofold, one is to get the answer for myself and the other is to provoke other people to ask the same question just in case there is something out there that has been missed recently.” (P1)*

*“And, what it has meant for us as well is, whilst I was to a small extent aware of [...] issues, I was not particularly aware about [...] issues, and I think kind of organisationally, it was not something which we had engaged with, but which is*

*now...as I say at the very least for me, and I hope for others, it's something which we would have a greater awareness of as we look at our more general work.” (P12)*

*“Ok, so [...] happens every [...] Our theme for [...] is [...] and in order to get some headlines I'm trying to generate projections of [...] likely to be found in the world if nothing changes [...].” (P14)*

In the case of participant 1, it was actually an absence of information that prompted them to try and provoke people to think about how important something was. They were themselves unable to find information, and decided consciously to use this experience to direct more attention on to this topic area by asking colleagues about it. Participants 12 and 14 were perhaps slightly more orthodox in that both mentioned that the situations that they had described had in some way generated greater awareness of a specific issue – for participant 12, this included generating greater awareness in their own mind. Participant 14 seems to have specifically set out with the aim of garnering headlines and focusing attention on cause and effect – A will lead to B if you don't do something to stop it.

This code overlaps with but is not the same as 'You're trying to make a case'. One overlap lies in the fact that in many of the situations referenced by quotes organised under 'In order to grab some headlines' the participants were seeking to influence others. However, the ways in which participants use information to do this differs. In 'You're trying to make a case' participants describe using information that supports a position – this can be thought of as positive information. The open code 'In order to grab some headlines' contained not only uses of positive information, but also a case where a participant attempted to use the absence of information in some way. Absence in this sense actually refers to 'uncertainty' – because of a lack of positive information about an issue, participants experienced an uncertainty about the state of an issue. This, however, is also information in its own way, in that participants had become aware of the existence of a previously unknown uncertainty – a gap in knowledge. Participant 1, as discussed, actually attempted to then use this new knowledge of an uncertainty to provoke attention.

Much of the discussion of data in earlier parts of this chapter has focused on the importance of interactions with others in participants' use of information. By and large, a picture is presented whereby participants' use of information is geared towards influencing other people to take certain actions. However, it is important to point out elements in the data which show a slightly different journey with information. The open code 'In order to get some headlines' is one example of this different journey. Interaction with others was not always present in the quotations related to garnering headlines. Participant 12 for example also mentioned the effect that information had had on raising their own awareness – rather than the affect it had had on the awareness of other people. This code helps to highlight that influence can exist at different levels. It can describe influence on thinking and awareness or knowledge which can occur within the self or in interaction with others. It can arise from the use of information but it can also arise through the realisation of absence of information.

Another thread in the interview data provided more insight into how information could be involved in the participants' efforts to understand and relate to other people's opinions and perspectives. This was represented by parts of interview data organised under the open codes 'Framing an issue' and 'How do we make sure everyone is on the same page'.

Selected examples of quotations organised under these codes are:

*"[...] well it helped me frame the article in a way that would appeal to the editors."*

(P3)

*"The aim is to update our policy asks and to include, and to sort of fill the gaps I suppose. So there's a whole process there about how we do that, in the light of the current government. So there's some sort of possible re-framing of the way we talk about them that might be more relevant to the current politics." (P4)*

*"So, and we also talked to [...], and [...] had a briefing on kind of [...], although a lot of that was more about sort of development issues, there was a chunk that was useful, so we circulated that as a source of information to people in advance. So the purpose*

*was, [...] you know, firstly how do we make sure everyone is on the same sort of page and then secondly, how can we create a space in which we can use that information to help us create a policy ask.” (P4)*

*“Er, very early on in the process I heard through a number of connections that [...] another group were doing exactly the same thing that we were trying to do, and that would obviously present an opportunity for us to either collaborate together, or if we were going towards similar but separate ends, it might be a bit of a threat for what we were trying to do. So I was tasked by...the working group who I work on behalf of, to find out, to get in touch, to firstly identify if that was true, who was doing it, who was leading the work, what their aims were, what their timelines were, er, do they feed into us, are they willing to cooperate with us, is their work something we want to support as well?” (P7)*

These two codes shared common ground because they both represented situations where participants had acknowledged different perspectives of others whom they were interacting with, and had, because of this been motivated to use information in a certain way. ‘Framing’ seemed to relate to adapting communications to better appeal to others. The code ‘Framing an issue’ therefore developed to include other, similar instances which indicated that participants thought ahead about likely reactions to their communications, and attempted to adapt information to smooth the passage of these communications:

*“But actually, thinking about it, it did inform the feedback because when we gave the feedback back we were able to suggest that the student do this, this and this, and re-submit the project, rather than saying they do a whole new project, so in that sense we were able to perhaps soften it in a way. So it was useful, actually to know, because then there was the options, it wasn’t just clear cut, they could resubmit, or they could do a whole new project if we gave them a one.” (P5)*

Framing is seen as looking ahead at how another person may react to a communication, and trying to present that communication in a way that will ensure receptiveness or a favourable reaction. The code 'How do we make sure everyone is on the same page' seemed to relate to establishing existing positions on an issue, and also potentially using information to moderate the positions of others in some way – preparing the ground for further work. Implicit in this is the fact that everyone has their own perspectives on information. To an extent, perspectives may be amenable to change, and this change may be accomplished with the help of information to add new knowledge. Making sure a group is 'on the same page' is about using information to establish that there is common ground between different individuals. At a basic level, it is about orienting individuals within a system of beliefs or knowledge – finding out where other people stand, and possibly attempting to alter their position. Both the open code 'Framing and issue' and 'How do we make sure everyone is on the same page' are about the use of information to bring people together, and relate to understanding the perspectives of other people. 'How do we make sure everyone is on the same page' differs slightly because it can be about using information to change other people's perspectives or find out whether shared perspectives exist. 'Framing an issue' is not about changing someone's perspective, or establishing common ground – it is about presenting information in a way that will better appeal to their existing perspective or be better suited to their situation.

The concept of framing seemed to fit alongside the elements of building a case and gaining attention because there was a shared purpose in influencing other people through the use of information. 'Framing' as a term seemed to suggest a slightly less confrontational approach than is indicated in cases where participants refer to building a case, or arguing for something. However, it could be seen as one strategy for using information that might be involved in case building. Participant 4 for example, who gave one of the examples of the use of framing during their activity also represented an example of trying to build a case, and had several quotations organised under both codes.

The final selective code identified through open coding, 'Paths to influence' was about strategies or ways in which the participants could communicate information to others. It was about communicating with a specific goal of influence, to have a certain effect on other people. The part that information played within these communications was of interest as a potential 'help' of the kind relevant to a sense-making study.

## **7.8 Conclusion**

This chapter has described the results of the open coding process carried out during the research, and how this process eventually led to the grouping of open codes into selective codes. Following this process the five selective codes described above were generated. A summary table providing an overview of the final set of open and selective codes is provided in appendix 9. The selective codes that were developed provided some insight into how information was perceived by the participants, and into the underlying characteristics of the situations in which they interacted with this information. The five selective codes are summarised briefly below:

### **'Personal experience, knowledge and perception'**

This code captures the fact that participants' interactions with information are driven and affected by personal experiences. This code is helpful in understanding how participants perceive different types of information e.g. qualitative or quantitative, grey literature or factual truths. A struggle between the usefulness of subjective forms of information and the need to make use of objective information is apparent. The code also encompasses some of the data which describes the sense of purpose that participants derive from information, with that purpose being for the information to act as evidence. The tendency of participants to perceive information in terms of its potential evidence-purpose can be seen in the data brought together in this selective code, and is a conceptual uniting factor for that data.



### **Experience of external perceptions of information**

In this code, the focus is on participants' experience of the way in which other people perceive and react to information. This selective code depicts the way in which participants attempt to reconcile their own perceptions of what constitutes useful information or evidence, against the perceptions of other people. Often, problems seem to arise when participants want to take a broader, more inclusive view of evidence while others with whom they are communicating have quite narrow or specific views on what is acceptable as evidence. Participants have experience of these external perceptions making themselves known in the shape of political will or other barriers which may be erected to hinder the participants' efforts.

### **Integration and evaluation of information**

The data gathered within this code highlights the elements or criteria which the participants look for when interacting with information, with a certain purpose in mind. These elements include considering the relevance of information, its truth-value, authority, credibility, how it is defined, and can also include areas such as the way in which information is formatted and presented. This data represents participants' efforts to determine whether to believe information through the application of these criteria. The factors listed above are used by participants to help make such judgments.

### **Influence**

The selective code 'Influence' highlights the way in which the participants attempt to achieve influence and most importantly for this research, the emphasis that is given to information in achieving influence. The role of information appears to be as evidence, and evidence helps to achieve influence. Goals of influence can include long term aims such as policy change, and also short term aims where participants have a more immediate desire to draw attention to a certain issue. Influencing other people may include persuading these people to change their thinking on an issue or think about something new, and persuading a group of

individuals to agree on the importance of an issue as a preliminary step before carrying out more work towards achieving more long term influence with policy makers on that issue.

### **Paths to influence**

This selective code gathers data which relates to attempts by participants to use information or evidence to exert some form of influence on another person or people. This code represents the more practical strategies which participants engage in when communicating information that they think will be influential. These attempts take forms such as use of information in an argument, or to support recommendations. There are also more subtle uses such as framing. Paths to influence include an element of evaluation of information for its potential to influence and also thinking about the actual method of influence for which information might be suited, e.g. argument or framing.

Many of the five selective codes described in this chapter seemed to suggest potential relationships to one another as a result of the data organised within them. The next stage of the analysis focused on developing these relationships, and presenting these selective codes as an organised pattern of behaviour. This pattern was arrived at through theoretical coding, the process and outputs of which are described and presented in chapter 8.

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## **8 Selecting a core category and building a process of sense-making in public health**

### **8.1 Introduction**

Chapter 7 documented the outcome of the open coding process and the development of five selective codes: 'Personal experience, knowledge and perception of information', 'Experience of external perceptions of information', 'Integration and evaluation of information', 'Influence' and 'Paths to influence'. The present chapter continues and advances the analysis by using theoretical coding to incorporate these selective codes into a substantive theory of sense-making in public health, as seen in the participants of this research.

This chapter has several functions. It begins with an overview of how the process of theoretical coding was undertaken in this research, including a brief summary of the technicalities of tracking and storing data for theoretical codes. This summary includes an explanation of the role which existing literature played in the development of the sense-making theory which is presented here. This chapter references a body of external literature on various concepts during explanation of theoretical codes. These concepts emerged during analysis and include evidence, evidence based practice, authority, relevance, authenticity and expertise. Further details of how existing literature was used to help develop ideas during theoretical coding are provided in section 8.2.

Section 8.3 comprises a discussion of the core category or code, the development of which is a key part of the process of theory generation in Grounded Theory (GT) research. The chapter then continues with the presentation of the substantive theory of sense-making (shown initially in diagram form) that has been developed. This theory sets out a pattern of behaviour in terms of the participants' interactions with information and people, which has been identified in the interview data. The theory diagram also acts as a map for the rest of the chapter. Following the presentation of the theory diagram, the bulk of the chapter

consists of a narrative which describes and explains the theoretical codes which have been developed to create the substantive theory.

## **8.2 Process of theoretical coding and development of a substantive theory of sense-making in public health**

Theoretical coding is an important final stage in theory development in GT research. It determines the relationships between selective codes (sometimes referred to as substantive codes) (Kelle, 2011, Holton and Walsh, 2016) , in order to understand the observed patterns of behaviour in a way that is grounded in the data. There are various choices for a researcher in how to derive theoretical codes. They can come from other codes or categories already existing in the research - an existing code can come to represent the relationship between two other selective codes (Urquhart, 2013a). Alternatively, relationships can be inspired by families of relationships drawn from existing philosophy and social science literature (Kelle, 2011). During the development of the sense-making theory suggested in this thesis, theoretical codes were essentially derived from codes, categories or concepts already existing within or suggested by, the interview data, rather than being created by applying codes from existing social science theories. However, existing literature did play an important role in the development of the sense-making theory which is proposed, and in determining links between selective codes.

Existing conceptual literature was used to help elucidate the meaning of proposed theoretical codes, and so to help determine links between selective codes. For example, where participants referred to topics such as authority and relevance when interacting with information, existing conceptual literature on these topics was consulted. This literature indicated that these concepts are thought to be partly individually perceived and conferred criteria, helping to identify a conceptual link between the selective code 'Personal experience knowledge and perception of information' and the selective code 'Integration and evaluation of information'. This conceptual link was then developed, and verified using supporting data from interviews, into the theoretical code 'Individual knowledge-experience frameworks

inform integration and evaluation information'. See section 8.4 for the full explanation of this particular relationship.

This application of literature could be considered to be a deviation from the use of literature recommended in 'classic' GT. Glaser, Corbin and Strauss have been understood at various points to advocate "*delaying comprehensive use of the literature until after the analytical story emerged and stabilized*" (Lempert, 2011 p.245). However, other researchers using GT Methods have pointed out that reading of appropriate literature *during* the stages of memoing and developing codes and concepts during analysis (i.e. before a theory has emerged, and in order to help develop a theory) helps to better understand emerging concepts, creating a more nuanced picture of what is happening in the data (Lempert, 2011, Urquhart, 2013a). It is stressed that, although existing conceptual literature played an important part in defining and understanding the relationships between selective codes (and therefore in developing the theoretical codes), the jumping off point for these forays into existing conceptual literature was always the language or ideas which were put forward by the participants during interview. The process of theoretical coding in this thesis involved moving back and forth between interview data, existing literature, and interview data. Ideas on what were important concepts for participants always came directly from the data in the first instance. These were then explored in literature for further development before returning to interview data to compare new ideas to what was present in the data.

The exercise of theoretical coding was tracked and organised using similar methods to the open coding process described in chapter 7. An MS Excel spread sheet was used to keep a record of interview quotations ascribed to each theoretical code, with a separate column used to keep analytic and interpretive notes relating to the quotations. This assisted with the development of each theoretical code, helping to understand and articulate the criteria of the code, and how each quotation contributed to a central idea. This stage of the coding process is iterative, involving movement back and forth between selective and theoretical coding as a theory begins to take shape (Urquhart, 2013b). This proved to be the case in the present

research, as the original set of selective codes and consequent grouping of open codes altered during theoretical coding. Finally, the five selective codes which were presented in chapter 7 were confirmed, and these codes were then linked through four theoretical codes: 'Evidence based practice', 'Individual knowledge-experience frameworks inform integration and evaluation of information', 'Integration and evaluation of information to develop potential to influence' and 'Communication with intent to influence implemented through paths to influence'. The organisation of selective and theoretical codes in this way created a substantive theory of sense-making as seen in the participants of this research - this process is presented and explained throughout the remainder of the chapter, beginning in section 8.3.

### **8.3 Development of a core category and a process of sense-making in public health**

Figure 8-1 shows the theory of sense-making developed through theoretical coding, in diagram form. For clarity, the various selective and theoretical codes shown in figure 8-1 are numbered and colour coded. Selective codes are labelled SC, followed by a number, and shown in green shaded boxes. Theoretical codes are labelled TC, followed by a number and are shown in blue outlined boxes. Several drafts of this diagram were created during the write-up, in an attempt to find a clear presentation which could be easily understood by readers. This included a version which did not include the selective codes, attempting to present the theory by emphasising the theoretical codes. While it is the theoretical codes which form relationships between the various stages which participants appear to go through when interacting with people and information, and therefore is the theoretical codes which really make the theory, in the final draft it was felt that the selective codes should be included in the diagram to make it clear which selective codes were joined by which theoretical codes. Figure 8-1 presents a theory of sense-making in public health, which consists of 3 stages (represented by theoretical codes 2, 3 and 4 in figure 8-1). The whole theory is surrounded

by a further theoretical code, 'Evidence based practice', labelled as theoretical code 1.

'Evidence based practice' is the core category for this analysis.

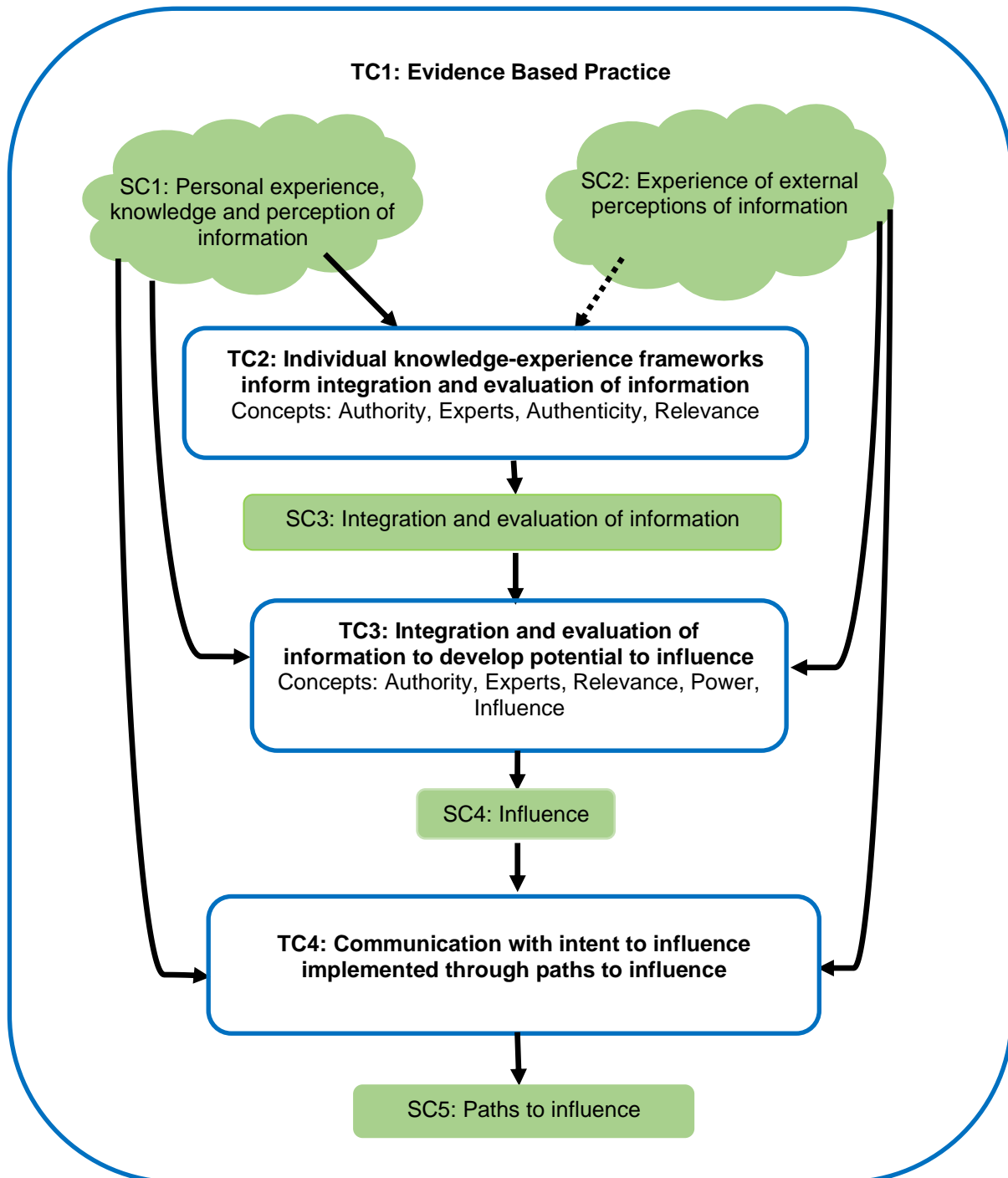


Figure 8-1: Integrative diagram showing theory of information use in public health.  
TC = Theoretical Code; SC = Selective Code



Development of a core category is an important step in the process of theory development in Grounded Theory research. Following the processes of GT entails several different layers of coding: open codes, selective codes and theoretical codes. One of the challenges in developing the substantive theory which is presented in this chapter was in grasping the differences between these stages of coding, particularly in selective vs. theoretical coding and how these stages of the process fit in with the emergence of the core. Specifically, understanding which *type* of code, out of all the types generated could be potential candidates for the core category was initially problematic. When during the process of coding the 'core' should emerge also proved difficult, as this seems to vary depending on which account of GT methodology is consulted. In one handbook, it is suggested that the core emerges during the stage of selective coding, and that the core is drawn from the selective codes (Urquhart, 2013b). In other accounts, the core is described as "*any kind of theoretical code*" (Holton, 2007 p. 279) and it is suggested that it emerges *before* selective coding, because during the process of selective coding "*Selective coding begins only after the researcher has identified a potential core variable.*" (Holton, 2007 p. 280).

Attributes of the core category which do seem to be agreed upon in different methodological writings on GT are:

- Its ability to explain the majority of patterns of behaviour witnessed in the research (Glaser, 2005), (Holton, 2007).
- That it relates to as many other categories as possible or 'integrates' other categories (Holton, 2007, Hernandez, 2009)
- That it recurs frequently in the data (Holton, 2007) (Urquhart, 2013b)

In cases where there are thought to be multiple potential core categories, the researcher can choose one of those categories as a focus, regarding other potential cores as near core (Glaser, 2005). Holton's (2007) statement that any theoretical code could be a candidate for the core was interpreted to mean that any of the 5 selective codes, and any of the theoretical codes were potential core codes. The core category and a single near core category

emerged during the process of theoretical coding. Considering Glaser's statement about the ability of the core to explain patterns of behaviour (Glaser, 2005), it could be argued that it is logical for the core category to emerge after selective coding. Certainly for the present research, it was not until the stage of selective coding that a pattern of behaviour could be identified with any confidence. If a function of the core category is to explain the pattern of behaviour then it follows that a pattern of behaviour must be identified before the core category can be identified.

Based on the core category criteria of frequency, explanatory power and ability to integrate, the two candidate core categories that emerged from the interview data were: 'Evidence Based Practice' and 'Influence'. Only one of these (influence) is drawn from the selective codes. The other (evidence based practice) is a theoretical code. These two codes initially stood out as candidates for core because of the frequency with which they occurred in the interview data. There are a total of 91 instances of the use of 'influence' as a code for quotations from the interview data. 'Influence' has been used to code at least one quotation from every single interview participant, and for 4 of the 14 interview participants, the code was used to organise 10 or more quotations per participant (see appendix 3).

'Evidence Based Practice' had a more complicated journey through the coding process than 'Influence'. 'Evidence' became a point of interest fairly early in the analysis, because of the way in which some participants referred to it - seemingly as an essential part of their work. This concept began its existence in this research project as an open code. The term 'evidence' was noted to occur quite frequently from early on in the interview process. This high frequency of occurrence led to an early catch-all open code of 'evidence' which was then gradually fractured into a series of smaller, more specific open codes. These included 'Evidence is a mixture of things' and 'Effects of narrow perceptions of evidence' (see chapter 7 for a list of open codes). As a result of the early emergence of evidence as an idea of importance, the researcher began to listen out for further reference to the concept in subsequent interviews, attempting to clarify participants' meaning when using this term

during interview if necessary. Conducting interviews in this way, by using data from early interviews to drive the development of the research is an accepted practice in Grounded Theory research (Duffy, Ferguson et al. 2004).

Once the fracturing of the initial open code for 'Evidence' into smaller codes had occurred, 'Evidence' came to exist as a selective code almost by default. As a selective code, 'evidence' also occurred frequently. There were a total of 140 instances of the use of the selective code 'Evidence' (now Evidence Based Practice) as a code for quotations, from the interview data. 'Evidence' was also used to code at least one quotation from every single participant, and for 7 of the 14 interview participants, the code was used to organise 10 or more quotations per participant. In the sense of raw numbers, both 'Evidence' and 'Influence' met the simple requirement of frequent occurrence (though this is of course only high in relevance to the frequency of occurrence of other selective codes in the data rather than by any absolute standard - see appendices 2, 3 and 4 for tables showing counts of frequencies of open, selective and theoretical codes).

However, as the analysis progressed to the stage of theoretical coding described in the present chapter, it was felt that 'Evidence' did not work as a selective code. This was because the evidence related open codes developed earlier in the research seemed to fall into two distinct groups, which therefore each required their own parent selective codes: 'Personal experience, knowledge and perception of information' and 'Experience of external perceptions of information'. All evidence related open codes therefore did not sit easily under a single selective code of 'Evidence'. Such a grouping could have been applied, with 'Evidence' as a selective code, and was tried in early attempts at theory building. However, this approach was eventually abandoned as it felt that it obscured some of the meaning of the participants' experience.

The two distinct groups which had formed from the discarded selective code of 'Evidence' each helped to understand slightly different aspects of participants' experiences. One group, labelled 'Personal experience, knowledge and perception of information' contained open

codes such as 'Evidence is a mixture of things' which provided insight into participants own thoughts on evidence, while the other 'Experience of external perceptions of information' contained open codes such as 'Effects of narrow perceptions of evidence' which highlighted participants experiences of interacting with other people in relation to evidence. It became clear through the process of selective coding that the experiences represented by these two selective codes were about more than just seeing information as a type (i.e. evidence). They also represented the idea that participants were interacting with information and other people in a certain way, and viewing that information and those interactions in a certain light.

Once the conceptualisations of the two selective codes related to perceptions of and interactions with information began to crystallise, and as the theoretical codes linking the selective codes into a pattern of behaviour were defined, a new role emerged for 'Evidence' - as a theoretical code that encompassed participants' experiences of interacting with information and people. A small alteration of the code name from 'Evidence' to 'Evidence Based Practice' completed the journey of this code through the analysis. In its new form as a theoretical code, 'Evidence Based Practice' shows how a specific way of interacting with information is created and constructed by the participants in this research. It became clear that 'Evidence Based Practice' affected not only how participants perceived information, but also how they interacted with it subsequently.

Returning to the rationale for 'Evidence Based Practice' as the core category, the criteria of frequency of occurrence of both 'Influence' and 'Evidence Based Practice' has been summarised briefly above. However, in addition to frequent occurrence, a core category also needs to have explanatory power. In terms of this kind of power, Evidence Based Practice meets the requirements. It has function in explaining participants' actions at every stage in the proposed theory. These actions are set out in greater detail throughout the remainder of this chapter as the developed theory is explained, but for the purposes of justifying the choice of Evidence Based Practice (EBP) as a core category, a brief summary is provided here.

EBP links the participants perceptions of information and their thoughts on how other people with whom they interact can and will perceive information. As the open codes which were developed and described in chapter 7 document, much of the participants thinking on their interactions with information is thinking about how they can conduct EBP, what they think constitutes evidence, and what they think other people with whom they interact think about what constitutes evidence and EBP, including whether this differs from their own views.

There is also some indication of the difficulties that surround ideas about evidence, mainly because different people do have different views on the concept.

EBP provides an accepted context within which participants see themselves as operating. They accept that this kind of practice is expected of them, and that they must engage with it. EBP shapes specific instances of the participants' interactions with information. However information is perceived by individuals, it is assessed for its potential use as evidence and its usefulness within an EBP interaction involving other people. Participants tend to use terms such as credibility, authority and relevance to structure their thinking about different potential sources of evidence. Once these concepts are understood in detail, and specifically, once the social dimension of these concepts is understood, it is possible to link them back to EBP. Essentially, it is suggested that participants value these concepts as measures during EBP because EBP involves interaction with other people as well as with information. EBP assumes the presentation of evidence or a communication about evidence to another individual at some stage in the proceedings. Assessing evidence against criteria such as authority and relevance as part of the preparation for this communication enables the participant to have the best chance of their evidence being accepted and of exerting any desired influence.

'Influence' is therefore also connected to and can be explained by a core category of EBP, as it appears to be an important goal of EBP for participants. The purpose for which the participants engage in EBP and the purpose for which they think about authority, credibility etc. is influence. Whether it appears at a micro or macro level (i.e. mild influence on a small

number of peers in terms of getting them to think about something from a different perspective vs. influence on a powerful decision maker to make a change in an action that will effect whole populations), the goal of EBP generally seems to be to bring others to agree to hold a certain position or to carry out a certain action. The connection between influence and EBP is apparent both through the interview data and conceptual literature on evidence and influence. Strategies for the application of influence then fall into place as ways in which the participants communicate their sense-making efforts and their understandings and interpretations of EBP for each individual situation that they encounter. EBP was therefore felt to be the most appropriate choice of core category for the sense-making process displayed in figure 8-1. This code met the key requirements of frequency and explanatory power, relating to all other selective codes which had been identified at the end of chapter 7. The relationship between EBP and the selective codes defined in chapter 7 will continue to be demonstrated in the next section. Section 8.3.1 also sets out a more nuanced understanding of how the participants in this research experienced this core category, as a socially constructed way of interacting with information and people. This is achieved through the use of existing literature on EBP, in combination with participant interview data.

**8.3.1 Evidence based practice as a socially constructed activity involving information and people**  
Evidence based public health practice, a form of EBP which is specific to this domain, describes a specific way of interacting with information in public health. Available definitions of evidence based public health practice (EBPHP) include “*conscientious, explicit, and judicious use of current best evidence in making decisions about the care of communities and populations in the domain of health protection, disease prevention, health maintenance and improvement (health promotion)*” (Jenicek, 1997 p.190).

This definition presents two perspectives on EBP – an activity of using evidence to support decision making, and a thing that is evidence. It suggests that evidence is used in public health for communication of ‘right-ness’ of a decision to other people. This in turn suggests that in a sense, the process of EBPHP must be agreed upon as the correct process by the

various actors involved – both the communicators and those they seek to influence. If this agreement did not exist, EBPHP would cease to be viable as a way of interacting with information and people, and would, presumably be abandoned. The interview data supports the idea that participants are using evidence to point the way to define correct choices in public health action – this will be made clearer through the discussion of subsequent stages of the theory. It also suggests that there is a general acceptance among participants that EBP is an appropriate way to work, as participants perceive an expectation that they will use evidence – chapter 7 included examples of interview data where participants reported being expected to use evidence by individuals whom they were interacting with. The selective codes for 'Experience of external perceptions of evidence', 'Paths to influence' and 'Influence' all contained elements of data which suggested in different ways that the expectation of EBP was perceived by participants. Participants themselves also conform to and appear to agree with these expectations because they respond by attempting to use evidence, in some cases going to some lengths to try to find or assess it. Participants efforts to assess information with a view to using it as evidence can be seen through the selective code 'Integration and evaluation of information'.

The interview data also suggests that participants are involved in using evidence to support decision making, as suggested by the definition of EBPHP above. Examples from the interview data with specific reference to use of information or evidence in making decisions or making choices include:

*“It’s an interesting one when you’re a researcher because... especially one who is trying to focus on producing evidence for local practitioners. Local practitioners often want information that’s relevant, very relevant to their area, to their decisions. When you’re trying to write a research article you’re writing something that’s going to appeal to editors and other academics [...]” (P3)*

*“[...] that’s actually the nature of and the joy of evidence, you know it’s all those different things. And it comes back actually to my [...] example. The way to thrash out*

*and come to some sort of decision is by trying to understand those nuances between [...], and what the people in the community want [...].” (P8)*

*“And, to me the kind of overwhelming issue is that often evidence is overwhelmingly ignored by decision makers.” (P12)*

*“It’s also about making judgements on the evidence, because the committee has to interpret all of that and think what does this mean in terms of what people might actually do. So it’s also their expertise that’s called in to this as well.” (P13)*

These quotations confirm that participants perceive an involvement in decision making, and a role both for themselves and for information within decision making - this role being to act responsibly and accountably in decision making and to use information as evidence. The above quotations are examples drawn from the selective codes 'Personal experience, knowledge and perception of information', 'Experience of external perceptions of information', 'Integration and evaluation of information', 'Influence' and 'Paths to influence'. The fact that interview data which can be interpreted as demonstrating engagement in EBP can be drawn from all five selective codes in the analysis further demonstrates the integrative power of EBP as a core category in the theory of sense-making in public health.

The definition of EBP drawn from existing literature and referenced above, together with the participant quotes referenced above highlight the interactive nature of EBP. EBP is not about participants interacting with information in isolation. The participants' interactions and communications with other people are equally important in their interactions with information. It is suggested that EBP is a socially constructed way of interacting with and perceiving information. Social constructionism is defined as “[...] a sense-making process that relies on a socially generated understanding of the world. This central premise of social constructionism is based on the belief that (1) reality is intimately linked to subjective experience; (2) subjective experience, while assimilated at the individual level, is nevertheless defined by broader social forces and effects; and subsequently (3) understanding of one’s personal experiences corresponds to socially constructed concepts that shape, direct, and normalize the meaning of



*such experiences.*” (Allen, 2017 p. 1628) . As noted above, EBP is an expectation which participants perceive to exist. This expectation comes from their experience of interacting with and communicating with other people as part of a wider group of the public health workforce, which can be thought of as a social group.

As well as describing EBPHP as a process, literature definitions of EBPHP also present evidence as a ‘thing’. It appears that participants may also have similar perceptions of evidence. There are many instances in the interview data where the word ‘evidence’ is used in a way that suggests that it is seen as a thing, or discussed in terms of types, for example:

*“So that was, that type of evidence I suppose...and then for instance for the [...] there was simply a published list of [...].” (P2)*

*“So I was actually quite surprised they hadn’t come across it, and, you know the sorts of categorisations of things that they were looking at was identical to what [...] had already produced earlier in the year, which I am already using as my bible for where I go to if I want the scientific evidence on the subject. So I was also asking them, you know, how what they were planning to do was different to what the [...] had done.”*  
(P6)

*“And then I have a lot of colleagues who do natural experimental studies. [...] as researchers we can now research I guess what’s happening in the real world and see what, you know we can evaluate that as if it were a clinical trial, but because it’s as if it’s not randomised and it’s not blind and these kinds of things, so people would say it’s somewhat weaker evidence, and those are the more interesting questions to ask.”*  
(P11)

These views on evidence as something that has a specific role in decision making and evidence as a thing that is fed into that process are highlighted because based on the interview data, it appears that the flow of interaction with information depicted by the theory of participants' sense-making is problematic. The main difficulty faced by participants may

arise from a discrepancy between agreement on the process of EBPHP and agreement on the thing fed into that process, i.e. what kind of information should be used in EBPHP.

Data for the individual construction of ideas about what evidence is for the participants as they engage in EBP is represented in the selective codes 'Personal experience, knowledge and perception of information' and 'Integration and evaluation of information'. Participants sometimes expressed differing views on certain types of information e.g. some placed more trust in expert opinion or testimony as evidence, while others were more sceptical. There was also data to suggest that to some extent, conceptions of evidence were driven by pragmatic, situation dependent concerns and therefore may be open to modification or adjustment according to the situation. Chapter 7 also described the tension that seemed to exist around the uses of more subjective forms of information as evidence – it appeared that some participants thought these forms of information were not as well regarded as they should be. Perspectives on the usefulness of objective and subjective information as evidence are important to understanding and theorising about participants experiences.

Participants seek to establish facts where possible and will analyse information as part of an attempt to understand its factual content. As well as seeking factual or objective information, participants also consider more subjective information to be of value and think about the limitations of 'objective' or 'rational' information. This kind of information can be seen as reductionist or limited in its ability to answer certain types of questions. Alongside these thoughts and behaviours, participants must also confront and manage the perceptions of other people with whom they interact. While the usefulness and value of objective information does not seem to be in question, it appears that difficulties or disagreements do arise where more subjective information forms may be thought useful or are all that is available.

The debate around what constitutes 'evidence' and the challenge of defining it is not unique to public health, or to the participants' experiences. In a general sense evidence is a difficult concept to define. The Oxford English Dictionary defines it as "*Ground for belief; testimony*

*or facts tending to prove or disprove any conclusion"* (Oxford English Dictionary). This simple definition indicates that evidence has a purpose, and that purpose is proof. It has been pointed out that there is a lack of philosophical agreement on what constitutes evidence (Rysiew, 2012). Another definition describes it as *"information which is used in a court of law to try to prove something. Evidence is obtained from documents, objects, or witnesses."* (Collins Dictionary, 2020).

The second of these definitions refers to 'information', suggesting that evidence is a form of information. Viewed in this light, evidence could be a more specific form of information - something which is used as proof or as *"Grounds for belief"* in the OED definition (Oxford English Dictionary). This leads to the idea that evidence is not so much a specific type of information, but information used for a specific purpose - perhaps the purpose, rather than any attribute of the information itself, is the defining characteristic. After all, none of the above definitions refer to the information content of evidence in anything other than vague terms. Therefore, the thing that most clearly emerges from these definitions is the purpose. This purpose is to show that something is true, (or at least that something is likely to be true), to provide a rationale, to give a basis for belief and to persuade. A possible relationship between evidence and information is therefore suggested - evidence is information used for the purpose of belief, justification, proof or rationale. Evidence as a thing seems to be up for grabs – perhaps it is whatever the involved parties agree that it is – there is certainly a sense of this from one of the participants:

*"[...] I do think you need to consider a broad range of things, and not just go for stuff that's published in scientific journals [...] you basically need to use whatever tools are available to meet your objectives, as long as your objectives are good."* (P6)

It is difficult to separate out evidence as a thing from the idea of evidence based practice as a way of interacting with information in public health. Perhaps this blurring of lines between 'thing' and 'use' contributes toward the difficulties which participants sometimes experience during their attempts at evidence based practice.

Although this theory suggests that EBPHP is socially constructed, it is therefore difficult to state with certainty that the same applies to evidence when viewed as a thing. This leaves the participants in a difficult situation – they have a socially constructed and apparently accepted way of interacting with information in EBPHP, but they do not have an agreement on what information should be used for that process. This is an important basis for understanding the theory presented, because it explains the importance of not only participants own perceptions of information as evidence, but also their store of knowledge on other people's perceptions, and the way in which they use their knowledge and experience to assess information. Personal understandings of evidence are important, but the existence of an idea that participants can expect, based on past experience, that other people will share, may prove helpful in structuring individual interactions with information.

It is suggested that EBP acts as a socially accepted way of working with information and forms a context within which the whole of the participants' interactions with information and other people take place. It is also suggested that the participants' individual understandings and experiences of EBP form part of a mental or cognitive frame of reference which is possessed by each participant. This frame of reference is referred to as a knowledge-experience framework. The proposed knowledge-experience framework is an important aspect of the next theoretical code to be described, in section 8.4. The next section therefore begins by introducing the idea of the knowledge-experience framework within the sense-making theory, explaining how it originated from the selective codes described in chapter 7, and how it links several of these selective codes.

#### **8.4 Individual knowledge-experience frameworks inform integration and evaluation of information**

The second theoretical code indicated in figure 8-1 is 'Individual knowledge-experience frameworks inform integration and evaluation of information'. This theoretical code forms a link between three selective codes: 'Personal experience, knowledge and perception of

information', 'Experience of external perceptions of information' and 'Integration and evaluation of information'.

It was suggested in section 8.3 that EBP is a socially constructed concept, a way of interacting with people and information to which participants adhere. As something which is socially constructed, EBP is connected to participants own experience of their activities in public health. It is now suggested that participants' own past experiences of the world are represented by a knowledge-experience framework (K-E framework), and that this framework affects all of their current and future interactions with the world. The proposed K-E framework consists of two selective codes: 'Personal experience, knowledge and perception of information' and 'Experience of external perceptions of information'. Both of these selective codes represent different facets of the participants' knowledge and experience. The first is, as the name suggests, personal and individual to the participant. The data within this selective code indicates things about the participants' own personal views of evidence and information - what they look for, and what they think is important. The second represents the participants understanding and experience of how other people perceive and react to evidence and information. Of course, participants can never have direct access to the thoughts of others as they interact with them, and as those people interact with information. They can only observe and interpret the externals words and actions of others. However, the observations and interpretations which participants make go on to form part of their experience, perceptions and knowledge of how information and evidence are seen in public health practice. There is perhaps an argument that these two selective codes could have been replaced by a single code representing participants experiences - this was discussed earlier in the chapter. However, the two selective codes have been retained separately in order to avoid losing sight of what the data from the code 'Experience of external perceptions of information' shows - which is that participants interactions with other people are a very important part of their whole experience of interacting with information in public health.

A first step to understanding in more detail how the participants' knowledge-experience frameworks affect their interactions with information is to consider what these frameworks consist of. Based on the interview data collected during this research, it is suggested that, these frameworks include individual knowledge, memory and past experience.

Conceptualisations of similar mental frameworks have been proposed in various other fields, and this literature is now used to help explain what the knowledge-experience framework proposed in the present research is thought to consist of.

Brookes' fundamental equation has been interpreted by other researchers as highlighting that individuals possess mental frameworks which are thought to be *"governed by perceptions, attitudes, values - that is elements of people's situated reality or frames of reference."* (Todd, 1999 p. 858). In consumer research, a similar idea is encapsulated by the concept of cognitive structure: *"it is now widely recognised that one's acquired knowledge about specific domains has very powerful effects on a variety of cognitive processes and outcomes"* (Kanwar et al., 1981). Cognitive structure has been defined as *"a psychological construct that accounts for a form of human knowledge. Scheme and mental models are examples of cognitive structures. Cognitive structure provides meaning and organisation to experiences and guides both the processing of new information and the retrieval of stored information."* (Seel, 2012 p. 32). Learning theory suggests that there are 3 categories of cognitive structure: comparative thinking structures, symbolic representation structures and logical reasoning structures (Garner, 2007). These structures essentially help learners to *"make connections with prior knowledge and experience by bridging from the known to the unknown"* (Garner, 2007).

In conceptual terms, then, knowledge-experience frameworks consist of mental models and knowledge about the world. For the participants in the present research, specific elements of these mental models and knowledge can be identified. One such element has already been proposed – an individual awareness, understanding and acceptance of EBP as a way of interacting with information. This element will include knowledge, acceptance and

understanding of the social construct of evidence based practice and knowledge of the various interpretations of evidence as a 'thing' in public health. Participant understandings of EBP form part of a store of individual knowledge on the general subject area of public health. As well as the understanding of a way of working which EBP provides, participants' knowledge-experience frameworks also include subject knowledge. All participants in this research, and probably all individuals working in public health can be expected to possess a degree of special subject knowledge of public health which someone outside of the field would not have. This element of the theory will also show that, while there may be a shared store of knowledge on general public health, there are individual differences between the participants. Inevitably, as different participants work on different niche interests within public health, they have differing levels of knowledge on different topics. Participants who spend the majority of their time considering the effect of obesity on population health will for example have much greater knowledge on this particular area of public health than someone who has been working on alcohol control. As will be shown using examples from interview data, this in turn will affect interactions with information.

Memory therefore forms an important part of these knowledge-experience frameworks. The subject knowledge described above is part of the participants knowledge-experience framework because they remember it. Knowledge-experience frameworks can also include elements that are less formal than learned subject knowledge. For example, memories of past interactions with colleagues and other individuals are part of the knowledge-experience framework. As will be seen, participants may draw on memories of conversations with colleagues when making sense of information. In terms of the concept of EBP as a social construct, other people's perceptions of EBP and evidence are also thought to be important. Participants may remember how other people have reacted to information in the past, and this may inform their own reactions. Other elements of the knowledge-experience framework may include participants' understandings of concepts such as authority, relevance and authenticity, and how these apply to information. These concepts are informed partly by

participants own past experiences of interacting with information themselves, and partly by their experiences of what other people may think about information. Authority, for example, is both an attribute conferred by the individual, and something which is determined socially through group interaction. Participants do not, however, have direct involvement in the way in which other people interact with and perceive information. They can only observe as much of this interaction as is visible to another person. What participants observe of the interactions of others helps to inform their knowledge-experience frameworks. This experience can in turn be drawn on in future interactions with information and other people to judge information and predict, negotiate and hopefully overcome any discrepancies between their own ideas, and the ideas of other people with whom they interact.

The idea that individual knowledge-experience frameworks affect interactions with information implies that factors arising from the individual will have an effect on these interactions. This has been suggested before, for example Wilson's model of information seeking suggests that psychological or demographic characteristics affect interactions with information (Wilson, 2000) – although the emphasis there is on the effect of those characteristics on information seeking rather than information use or general understandings of what information consists of for a particular task and context. This statement of the importance of participants' knowledge-experience frameworks sets the scene for the next element of the theory. This next step will use interview data and literature on related concepts to show how these individual frameworks play out as the participants interact with information. The rest of section 8.4 will explore two ideas. Firstly, the way in which participant knowledge-experience frameworks affect interactions with information will be shown. Secondly, this section will highlight in more detail the assessment or evaluation of information as a specific and important element of participants interactions with that information.



#### 8.4.1 Interacting with factual information and expert testimony: authority

There are several examples of individual differences in interactions with information to be found in the interview data. These differences can be seen in the way in which participants react to information during the vignette exercises. There is evidence of differing reactions to several forms of information: factual or objective information and also some more subjective forms: expert testimony and qualitative information.

The first example shows reactions to factual information from participants 3 and 14:

*“[Reading out loud from article]: “obese children often go on to be obese adults, carrying with them an increased risk of heart disease and diabetes”. Now I’m half remembering discussions on this point from when I worked at [...]. Problematizing that sentence, although I dare say it’s probably true that er, it’s not a simple link. But I can’t remember exactly what the conversations were, or how well evidenced they were. So it’s just sort of making me feel generally sceptical but it might still be true.”*

(P3)

*“Obese children often go on to be obese adults” – well that’s true - “carrying with them an increased risk of heart disease and diabetes”. Indeed it does.”* (P14)

These examples were both seen as instances of reactions to information that is presented as ‘fact’ because both participants make references to ‘truth’ in their reactions. This implies that an objective truth is seen as a potential property of the information. The participants both consider the proposition that children of obese parents are likely to go on to become obese themselves and arrive at slightly different conclusions because of their different K-E frameworks. Participant 14, whose work was focused on combating obesity appears prepared to accept the statement about obese children being likely to become obese adults. They firmly accept this as ‘true’ without questioning it. Participant 3, who does not particularly focus on obesity in their work expresses some uncertainty on the topic, and is ‘sceptical’, not fully committing to the idea. The difference in amount of time and experience which these two participants have of working on obesity as a public health issue can be

inferred to result in different levels of knowledge and understanding of the topic. This in turn seems to affect how they interpret information. This point is not made to denigrate either participant, but simply to highlight the importance of existing knowledge in considering interactions with information.

Participant 3 made an interesting comment in their reference to half-remembered conversations on the topic with old colleagues, and this tends to confirm the importance of memory as part of knowledge-experience frameworks. The issue focus of participant 14 perhaps enabled them to greet the information they were reading with certainty. Knowledge-experience frameworks containing detailed existing knowledge that matched up to the new information that the participants received therefore resulted in the participant feeling confident in their own understanding of the issue. For participant 3, this combination of confidence of understanding and detailed previous knowledge was lacking, affecting their reaction to the information, making them less certain about its accuracy.

As well as considering the content of information, the same participants were also both noted to react to the source of the information, though in this case their reactions are more similar to one another:

*“When I read, [Reading out loud from article]: “University College London researchers”, and I thought oh well, that’s a decent University, it might be a good study” (P3)*

*“Ok, that’s interesting because we know that the longer you are fat in years of duration the greater the risk of ill health even if you’re not seriously obese it increases your risk just be being obese for longer periods. So it then tells us that it was University College London, so that’s important!” (P14)*

In each case, the two participants are picking up on the name of the academic organisation that was involved in carrying out the research which they are reading about. In each case, the fact that this is a well-known organisation with a good reputation indicates that the

participant might see the information in a favourable light. They appear to be using their personal knowledge of this organisation in an evaluative way. This provides one demonstration from the data of the suggested link between the K-E framework which comprises the selective codes of 'Personal experience, knowledge and perception of information' and 'External experience of information' and 'Integration and evaluation of information'.

Another example of differences in individual participant's reactions to information noted during the think aloud exercises came from participants 5, 7 and 9. These three participants all chose to read an article which mentioned a letter written by public health experts. The letter had been written to call for a public health measure, and had a lengthy list of 40 signatories, described in the article as 'top doctors and nutritionists'<sup>2</sup>, some of whom were named and provided individual quotations for the article.

*"The evidence is also to me, is presented very much as quotes from people with Dr or Professor in front of their name rather than I guess actual study material. Er, you know, they're given their eminence I guess by the fact that they've got a, you know they're Dr or professor and where they from, so Royal College of Paediatricians and Child Health [...]" (P5)*

*"I also question the use of rates of obesity have soared, because that's not necessarily true within some age groups. [...] so that prompted the thought of this, that healthy school lunches are the bedrock of a transformative childhood obesity strategy. I disagree with that, er, that makes me think of this is a very silo-ed letter and piece of work [...] So again I'd want to see the full list of forty because I'd want to know who is putting all those eggs in that basket." (P7).*

*"Er, so I'm always suspicious of articles that say 'top Drs' in them. 'Experts' is another word that's often used – and often you'll see 'experts say X' and actually what you've*

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<sup>2</sup> <https://www.bbc.co.uk/news/education-34358017>

*found is that three researchers happen to have said X and they're presented in a way that this is kind of somehow a balanced opinion across a professional discipline rather than three people giving their 'expert' opinions." (P9)*

*"[reading from article] 'The letter signed by 40 leading health professionals', so yeah, I would say that, that strikes me that they probably know what they're talking about. Which would reassure me that this article isn't just three doctors with an opinion [...]" (P9)*

*"[reading from article] 'The signatories include Professor Lord Darzhi of Denholm', well, he's pretty much a chap I'd listen to, you know, he knows his onions" (P9)*

These quotations show several things – firstly that the participants are picking up on the idea of 'experts' and discuss briefly the connotations of information presented as coming from experts – not all of which are positive. It therefore appears that the participants are, in each case automatically viewing this form of information as quite subjective – for instance they refer to their own opinions and the opinions of those quoted in the article. These quotations also show that despite this initial shared scepticism of 'experts' the participants do, in the end, still react differently to the information. Participant 9 seems fairly happy to accept that the 'experts' quoted in the article know what they're talking about, while participants 5 and 7 express scepticism. Perhaps P9 has through past experience gained some knowledge of the experts mentioned that leads them to place trust in them. However, the point remains that reactions do differ, and that something within each participant's K-E framework is causing this. It appears from the above examples that participants take an evaluative approach to information - the fact that they consider information source, and whether they agree with information indicates this. What is important in terms of the theoretical code which links participants K-E frameworks to the selective code of 'Integration and evaluation of information' is not just that reactions differ, it is also the shape of those reactions. Participants are making decisions, in the examples above, about whether to believe, or trust the information and/or the experts quoted within it - whether they think those experts are

credible or have authority. It is these ideas of credibility and authority which provide the link between individual reactions and 'Integration and evaluation of information'. Concepts of credibility, authority and expertise were noted during selective coding as concepts that might help to understand participants' interactions with information. As these concepts were thought to be applied in an evaluative way, literature defining them was consulted to help develop the theoretical code 'Individual knowledge-experience frameworks inform integration and evaluation of information'.

At a conceptual level, credibility, authority and expertise have overlapping definitions.

Authority is usually accepted as existing in two broad categories: deontic authority (referring to those in positions of authority over others) and epistemic or cognitive authority (referring to those regarded as possessing authority through superior knowledge/understanding of something) (Rieh, 2009). Epistemic/cognitive authority is therefore more relevant for situations where individuals are consulting written reports and literature. Cognitive authority is defined as *"the extent to which users think that the information is useful, good, current, and accurate. Cognitive authority is operationalised as the extent to which users think that they can trust the information"* (Rieh, 2002 p. 146). Credibility has been described as having multiple meanings: *"Rather than having one clear definition, credibility has been defined along with dozens of other related concepts such as believability, trustworthiness, fairness, accuracy, trustfulness, factuality, completeness, precision, freedom from bias, objectivity, depth, and informativeness"* (Rieh, 2009 p. 1337). A legal definition of the term expert is *"someone who is recognised as having a special competence to draw inferences from evidence within a certain domain"* (Ward, 2017 p. 263). Experts can also be defined by differentiating them from non-experts: *"experts know more, use the information they have differently and solve problems faster"* (Herling, 2000 p. 11). Conceptual literature makes the point that expertise is an underlying component of credibility and authority, and that experts are typically seen as people that possess authority: *"Experts are treated as authorities when their drawing certain inferences is treated as a reason for other to draw the same inferences"*

(Ward, 2017 p. 263); “[...] a cognitive expert, upon being asked why or how she behaves or believes the way she behaves or believes can offer an epistemically authoritative reason [...]” (Watson, 2018 p. 40); “All of us defer to the authority of experts” (Pierson, 1994 p. 398); “Experts perceived as not only credible or worthy of belief but also influential in other people’s thinking are termed cognitive authorities” (Rieh, 2009 p.1337). Conceptualisation of experts also links to conceptualisation of authority because experts are judged in terms of their perceived authority. For instance where expert testimony is used in a legal setting, individuals who are the audience for that testimony decide how much authority to grant the expert (Ward, 2017). This determines whether or not the individual regards the testimony as a reason to unquestioningly believe a proposition (i.e. granting the expert strong epistemic authority) or decides to base their decision to believe on further consideration of the track record of that expert (including their level of agreement with other experts and ability to respond to contrary arguments), granting the expert weak epistemic authority (Ward, 2017). The concept of authority therefore seems to be a common factor between the conceptualisations of credibility and experts or expertise.

As credibility, authority and expertise are all referenced during the participant interviews, it could be argued that authority is the important fundamental concept which underlies many of participants’ interactions with information. Seeking to understand how participants’ individual K-E frameworks affect their interactions with information is in fact seeking to understand how participants K-E frameworks interact with and relate to conceptualisations of authority as applied to new instances of information. As will now be discussed, the link between individual K-E frameworks and 'Evaluation and integration' of information arises because authority is an evaluative concept in as much as it helps individuals to decide whether to believe something. It can also be individual because it is conferred through personal judgment made by an individual.

It is thought that individuals apply indirect tests to judge authority in information, and that these tests include looking for institutional authority – cognitive authority can reside in

organisations as well as individuals (Rieh, 2009). Some of the participant quotations above indicate that participants may be engaging in this kind of judgement as an initial test for authority. Participants 3 and 14 were seen to take note of the university that had been involved in producing research as a possible measure of how good or important that information might be. Where information comes from an individual presented as an expert, consideration of the individual's reputation or qualifications (e.g. if they are a Dr or Professor) may act as a similar indirect test of authority. In these cases, participants may attempt to decide whether to grant experts weak or strong epistemic authority. In the examples above, participant 5 mentions the criteria of qualification or standing e.g. Dr, Professor (though it should be noted that they rejected these criteria as a way of judging the standing of evidence), and participant 9 mentions the idea of balanced opinion across a profession, which may equate to a level of agreement with other experts. In each case it appears that the participants are granting experts weak epistemic authority, because they resort to using what they know about individual experts and the information at hand (qualifications, level of agreement/support with information from other experts) to determine whether they will accept the information or not. It has been acknowledged that the process of judging potential experts is subjective (Ward, 2017). *"Experts are primarily judged by clients, not necessarily by peers (professional or scientific); and they rely on trust by their clients"* (Grundmann, 2017 p. 27).

Although it appears that, in each example above, all the participants are engaged in some form of evaluative interaction with the information viewed during the think aloud exercises, their eventual conclusions are different. This may indicate that, while important, authority judgements do not in fact have the final say in an individual deciding whether to believe information or not. It appears that for participant 3, institutional authority was not enough for them to accept the cognitive authority of the information and treat it as fact. Despite indicating that they thought the producer organisation to be an authoritative body, participant 3 was still unwilling to fully accept the information as fact because they lacked a sufficient

pre-existing knowledge based to compare it against. In the case of expert testimony information, there are hints that existing knowledge of the topic may also have some involvement in judgements. For example, one of the quotes shows participant 7 drawing on their pre-existing knowledge of obesity rates in different age groups to reject certain points made in the article. Participant 9 also draws on pre-existing knowledge, but of a slightly different form which may be more relevant to judging expert information. Participant 9 refers to one of the individual experts quoted in the article, in a way that suggests that they are familiar with that person. This familiarity leads them to respect and accept what that person is saying.

Such pre-existing knowledge can work both ways. In another example, Participants 7 and 14 highlight that an individual's existing knowledge may also lead them to reject information - either because of something they know that might affect their judgement of the authority of the source of information, or because existing knowledge leads to an alternative belief than that presented in the information:

*"It's saying forty organisations, and whilst I realise that they can't name all forty, I think there's only two that they mention, two or three, which is not very effective reporting. Because as somebody with a public health hat on, I want to know who is in this ring. They might be possible people I can work with [...] there might be people that I'm like well, you would sign that, it might be people that I know are taking funding from certain bodies that would maybe discredit the letter for me, or similarly if it was respected organisations or contacts that I knew." (P7)*

*"So when someone says that it was due, as this article did, to cheaper calories in the 1980s, there are several other [...] alternative hypotheses as to why the evidence is showing what it's showing. But that comes from my experience, and if I was reading one of the other of your documents about a public health area that I'm less familiar with, obviously I may not have that breadth of understanding of how these things have come about, and I would probably then take for granted whatever the author of*



*the paper had been quoted as saying, that it was cheaper calories. I wouldn't be able to think of an alternative hypothesis.” (P14)*

Participant 7 is aware that there are individual 'experts' out there whose views and opinions they may have reason to distrust. Participant 14 has previous knowledge which is sufficient to allow them to construct potential alternative hypothesis or explanations for phenomena presented in the information. In either case, the important point is the role of pre-existing knowledge, the K-E framework. This seems to be a key criteria for participants in the process of interacting with information. Self-awareness in terms of recognising a lack of personal knowledge may also affect reception of information. The interview data contained one example of a participant who did not feel that they could fully interpret information because they lacked confidence in their ability to fully understand how the conclusions drawn in the information were arrived at.

*“Er, I think there's another barrier for me, which is that I haven't recently done a statistics course. I have done in the past, er, so I understand the basic stuff, but I haven't quite got my head into the statistics of some of the findings. Er, it's hard to really get a grip on what they ultimately mean, so I'm not, I didn't feel absolutely confident that I could read the paper and get exactly the import of what it was saying. It's also not my area frankly, but ...all I wanted to do was be able to know enough to get by.” (P1)*

One explanation for this difference may be that individuals possess differing levels of prior knowledge on a subject area. Self-awareness and confidence in ability to understand and reflect on information differ as a result. If an individual possesses in-depth knowledge about a topic area, and consider themselves to possess in-depth knowledge this may affect their acceptance and agreement with information. The precise form that this affect takes (i.e. agreement or rejection of information) may depend on the content of the information and how it compares to the existing knowledge.

It therefore appears that it is possible that individual participants' K-E frameworks, enacted through perceptions of the match between new information and existing knowledge, ability to construct alternative explanations, and confidence in understanding information may influence whether or not they are prepared to grant authority to information which they encounter. As such, K-E frameworks are an important influence on the integration and evaluation of information which takes place during individual sense-making, including conferring attributes such as authority to information.

#### 8.4.2 Interacting with qualitative information: relevance and authenticity

So far, section 8.4 has focused on the interaction between individual K-E frameworks and the conferring of authority as participants make sense of information that is presented as factual or as coming from an expert source. There was also interview data relating to how participants integrate and evaluate qualitative information, and the role of individual K-E frameworks in these interactions. Whereas for information presented as factual or as coming from an expert source, 'authority' was an important concept in understanding these interactions, for qualitative information the concepts of authenticity and relevance may be more important. These concepts represent another element of the integration and evaluation of information, and the way in which participants use these concepts also appears to be influenced by their personal K-E frameworks.

Qualitative information appeared in the interviews both as academic research and also in less formal terms. For example participants referred to opinions of local people on public health issues as being important:

*“And from my experience, certainly when I was working in [...], in terms of shaping local policy, we used things like local surveys of the public [...] when it comes to influencing policy makers, local politicians [...] want to know, what did my local people think?” (P6)*

*“The third bit of evidence, I think is – particularly these days – is how people interpret their local circumstances, [...] so then the question is who are the people who are good at interpreting that? Well some of those would be, like with the [...] example, the people who are actually living in those communities and working in them” (P8).*

Participant 8’s use of the word ‘good’ suggests one potential criterion for how this kind of information is made sense of. The word ‘good’ is used elsewhere in the data to refer to accuracy of more objective evidence – the idea of correctness, for example:

*“I wasn’t requiring a great deal of numerical precision. I mean, I wanted the evidence to be good, but I wasn’t going to report the numbers in any great detail. I wanted to be able to say, [...] is a major global public health issue, and it’s a particular issue in European countries.” (P3)*

However, as used by participant 8, the term ‘good’ must mean something quite different. As the form of information discussed by participant 8 is people’s lived experience of something, it is possible that here, ‘good’ may mean something like authentic or genuine. In this example, the participant seems to be saying that the people who are actually living the lives that will be touched by a public health intervention are likely to be much better at understanding how that intervention will affect them than an outsider would. This information, if judged by an objective standard, could be called biased. We can imagine individuals putting forth their views on an intervention coming completely from their own standpoint and opinions and having only their own needs at heart. In such situations however, personal views may be the very point and value of that information, and the authenticity of the views the criteria against which information is judged. Interestingly, conceptualisations of authenticity found in literature lead back to the idea of ‘truth’ just as those for authority, credibility and expertise do. For example, authenticity, although having multiple meanings, is broadly defined as *“a concept aimed at capturing dimensions of truth or verification”* (Newman and Smith, 2016 p. 610). The words ‘genuine’ and ‘real’ are also linked to authenticity (Raczynski et al., 2013). As it is generally accepted that collections of

information on people's lived experience are not expected to represent a single 'truth', clearly the idea of truth, good-ness or authenticity as it may relate to this kind of information has a very different meaning from that associated with factual information. Where participant 8 above refers to how 'good' a person might be at interpreting their local circumstances, it is inferred that 'good' is used to mean that the individual is able to present an interpretation that is true to life as they experience it.

Another criteria by which information may be judged, which seems to be particularly applicable to qualitative information appears to be the ability of information to answer the right question. The idea of relevance is important here and may also apply to the information described in the quotes from participants 6 and 8 above. In each case, information from individuals affected by an intervention is likely to be highly relevant to understanding the workings of that intervention. Other examples of interview data also support the idea that for certain questions, relevance may be a more important criterion for assessment than an objective idea of 'truth':

*"actually those interpersonal discussions, I guess what would be called, if it was done more formally, qualitative work, becomes really important. And I think that it's interesting in the group that I'm in that we have a strong emphasis on the importance of qualitative research as part of the research package. In a world of complex public health interventions, RCTs are lovely if you can do them, but actually, they're not the answer often, to the problems that we're trying to." (P9);*

*"our studies are usually embedded in larger quantitative studies and they always just look at individuals, in our unit we do objective measurements [...] but of course what these studies can't do, they just look at the individual and say, clearly through their questionnaire, through their objective measures they seem to be healthy [...] This part of the study doesn't realise that this person [...]." (P11).*

Relevance appears to be another umbrella concept, suggested to be comprised of a series of parameters or elements, which include pertinence and importance as core elements (Ju and Gluck, 2011). Relevance is defined in terms of the connection which an individual can perceive between the information at hand and their own needs within the context of a specific task, user, problem and situation (Huang and Soergel, 2013). It is often discussed in the context of information systems and information retrieval, which can be taken to mean any kind of structured entity where a user can put forth a query and expect to be presented with a list of documents or results. The user therefore defines the relevance of information to them, and relevance is subjective. The slightly more specific concept of 'pertinence' is thought to mean those items of information that an individual finds useful in their particular situation (Kemp, 1974). This fits well with the experiences of participants and what they say about their requirements for information in different situations. These conceptualisations for relevance and pertinence as individual judgements made with reference to specific situations echo the comments made by some of the participants who consider that only certain types of information can answer certain types of questions, as in the example quotations above. As with the concept of authority, discussed in the previous section, it is not possible to determine from the interview data precisely what elements of the individual participants K-E frameworks lead them to view qualitative information as relevant for certain situations. However, some indications can be seen in the examples from P9 and P11 above. In both cases, the participants refer to their own past experience of qualitative work, in a way that suggests that this experience has led them to understand that qualitative work is particularly good at finding answers for certain questions. Conceptually, relevance seems to be less about the quality or believability of information, and more about the fit of information with a certain set of requirements. However, in a broad sense, assessing the relevance of information can still be thought of as an evaluative activity. The conceptual literature on relevance and participant interview data quoted above therefore in combination demonstrate that individual K-E frameworks comprised of 'Personal experiences, knowledge and perception of information' and 'External experiences of information' influence the 'Integration

and evaluation of information' forming a theoretical code link between these selective codes. This link exists because the participants can be seen to use their knowledge and past experience of interacting with information in public health to understand what information is the best match for certain questions and situations, and therefore to make choices to attempt to find or gather such information.

#### 8.4.3 Objective or subjective information, subjective perceptions

Throughout section 8.4, the role of individual K-E frameworks, which are comprised of the selective codes of 'Personal knowledge, experience and perception of information' and 'External experience of information' in influencing the ways in which individuals integrate and evaluate the information that they encounter have been discussed. This discussion has been presented as a reflection on the differences between encounters with different forms of information – factual information, expert testimony and qualitative information. This discussion has demonstrated the importance of some of the attributes of these individual K-E frameworks in determining individual interactions with information. The idea that underpins and connects all of this thinking is in fact the idea of the individual, and their importance in this process. The above discussion has referred to the subjectivity and individuality of judgements in areas such as epistemic authority. It is logical to assume that individual K-E frameworks are unique and subjective. This leads to the conclusion that all the processes and perceptions of information demonstrated in the interviews and represented by the substantive theory of sense-making that is proposed in this chapter are subjective. The sense-making process which participants move through is therefore subjective. In fact, once this process begins, it may no longer be appropriate to refer to an 'information' entity, because an entity suggests something that is separate from the individual. Once an individual comes into contact with information, the theory suggests that that information is changed, ceasing to exist in its original form because it has been filtered through an individual, subjective K-E framework. This echoes some ideas that have recently been discussed with regard to the nature of documents, where it is suggested that documents only

come into being who perceives and interprets those documents (Gorichanaz and Latham Kiersten, 2016).

However, accepting the idea that both sense-making and 'information' are subjective from the point of initial perception causes some difficulty for the theory. Earlier in the chapter it was suggested that while evidence based practice is a socially constructed concept which participants and those that they interact with share, within this construction, information used as evidence may be seen as a 'thing'. The view of evidence as a thing automatically implies an objective view of evidence because it strongly suggests that participants see evidence as separate from themselves. Chapter 7 described the tendency of participants to seek information that they considered to be true, and factually correct, possibly because they considered it to be a stronger form of evidence. The idea that evidence can exist in support of a universal truth implies that there is an absolute reality to the world which can be perceived equally by all. Yet, the interview data suggests otherwise as it appears to show participants perceiving and reacting quite differently to the same information.

Why do participants appear to persist with the idea that information can tell you the truth, and there is such a thing as objective information? One explanation is that a belief in the existence of information as an objective thing must have some value to the participants. It appears that there are several possible benefits to be had from a belief in the objectivity of science and so information produced through scientific methods:

- science has a purpose of providing explanations of natural phenomena – casting these explanations *“in terms of the absolute conception would help to realize this aim”* (Reiss and Sprenger, 2017).
- Scientific objectivity suggests that the world is structured and measurable, and that we are able to accurately observe and measure it. As a result, we can *“use our knowledge [of the world] to ground predictions (which, to the extent that our theories do track the absolute structures, will be borne out).”* (Reiss and Sprenger, 2017)

- Following on from the above, an ability to possess absolute knowledge of the world and to predict events within it means that we can make “*attempts to manipulate and control phenomena [...] grounded in our knowledge of these structures*” (Reiss and Sprenger, 2017).

In addition to these benefits, there is also an argument that the idea of scientific objectivity is socially constructed: “*Scientific fact is not a given, located somewhere 'out there' waiting to be discovered. Rather as a set of ideas, which offer to explain the world, scientific knowledge is produced by people and does not exist separately from them. 'Science' cannot pre-exist the social world in which it is produced. It follows that 'scientific research' is equally a product of social forces and cannot be epistemologically separate and 'objective' either.*” (Thorogood, 1997 p.152). Those who support the view that science is socially constructed state that: “*[...] because science is done by human beings who are inevitably influenced by ethical, ideological, and cultural values that the generation of scientific knowledge claims and the processes by which scientists decide certain claims should be treated as facts must be influenced by these contextual values*” (Bingle and Gaskell, 1994 p.191).

The sense-making theory set out in this chapter adheres to this view and asserts that although participants perceive objective information to exist, this idea of objectivity is in itself socially constructed. This does not mean that participants are thought wrong to hold this belief – it is not the function of this research to make judgements about what the correct conceptualisation of information is for any group of individuals. The goal is to understand why this belief is important to participants, and what it means for the way in which they interact with information. Another way of reconciling the contradiction between the fact that participants perceive objective information to exist and the fact that their perceptions are subjective might exist in document phenomenology. Exploration of the different perspectives which we may hold on documents to arrive at a holistic understanding suggests that documents are dormant until the point at which they interact with an individual (Gorichanaz and Latham Kiersten, 2016). It is only through this interaction that the dormant document or



information object becomes a document – that document is in fact a fusion of person and document rather than the document alone (Gorichanaz and Latham Kiersten, 2016). In this way, an individual perceives an information object, which comes to life as a true document through the fusion of perception.

Perhaps the idea that science is a social construct provides a way of squaring the circle for the present theory – showing that it is possible to have a subjective perception of the existence of the objective. Interactions, perceptions and conceptualisations of information or subjective sense for the participants appear to consist of wheels within wheels. Layers of social constructions such as science as an objective thing encompass further layers of social constructions on the nature of evidence based practice as a way of interacting with that information and as evidence as a contentious concept within that. Drilling down still further each individual participant brings their own knowledge and thought processes to these interactions. The idea of the subjective and the objective are threads that travel down through these layers of conceptualisation, social construct and understanding. However, they can only travel so far through the journey. In accepting that perception of information is always subjective, the proposed sense-making process also accepts that in the end, it does not matter what the original form of the information was, i.e. whether it was a form broadly regarded as subjective or objective. Once the individual comes into contact with that information and begins to make sense of it, those qualities may gradually lose their importance. What follows is the consideration of the sense which is at this point being derived from the information, and how this may relate to the achievement of specific goals for the participants.

## **8.5 Integration and evaluation of information to develop potential to influence**

The next step of the participants' sense-making as depicted in figure 8-1 represents the way in which the participants integrate and evaluate information in order to understand the influencing potential which they can derive through sense-making. The theoretical code

'Integration and evaluation of information to develop potential to influence' links the selective codes 'Integration and evaluation of information' and 'Influence'. In order to draw out the meaning of this theoretical code, it was helpful during analysis to view this as a question – what, in the minds of the participants, determines the potential of sense-making to exert influence over others within the socially constructed contexts of evidence based practice and scientific objectivity? The interview data suggests that concepts of primary importance might differ according to the situation faced, with important elements of those situations possibly including the target to be influenced and characteristics of the original source information which had been used for sense making. The concepts of authority and relevance have emerged as having some importance in making a theoretical link between the selective codes which represent participants K-E frameworks and selective code 'Integration and evaluation of information'. They are also important in making a connection between the stage shown in figure 8-1, of integrating and evaluating information to determine its potential to influence others.

The link between authority, credibility, expertise and influence can be seen in the following participant quotations:

*“I wanted to use it if it’s a good argument but I wanted to use it with authority in arguing [...] We’ve avoided arguing that we needed to have more stringent [...]” (P1)*

*“[...] that [...] report was produced by [...], a well renowned academic in [...] prevention, but for the [...] community for policy makers, to influence policy, and so the way it was summarised and presented was in a very accessible way to me.” (P6)*

*“We will not call for something until we are 100% sure that the evidence points to that as being the best option. [...] to me that’s an assertion and it’s not a fact, just because there is a percent in it doesn’t mean that it’s credible [...].” (P7)*

*“Yeah, I think it’s the quality of the research [...] a lot of those use a lot of estimates, and I worked abroad a bit in countries that tend to be estimated, and I know how*

*often they get it wrong. [...] before I think I would want to re-use it in an argument I would want to know that this is something solid to refer back to.” (P11)*

The reference to authority, credibility, renowned and credible scientists (who could also be described as ‘experts’), and the difficulty of information sometimes being ‘wrong’ which is seen in some of the quotations above indicates that one understanding of how participants assess the influential capacity of information is connected to their conception of the authority of that information. The way in which participants comments are thought to relate to the intention to influence has been discussed in chapter 7. At a conceptual level, the connection between the idea of influence and the overlapping concepts of authority, credibility and expertise may exist as a direct link, but also through a shared association of these concepts and the concept of ‘power’.

To begin with cognitive authority has been described as a *“kind of influence”* (Rieh, 2009 p.1340). Influence is *“a way of having an effect on the attitudes and opinions of others through intentional (though not necessarily rational) action – the effect may or may not be to change the opinion or to prevent a possible change”* (Parsons, 1963 p.38). Influence appears to be associated with ‘power’ as the two concepts are spoken of together (Parsons, 1963) (Austvoll-Dahlgren and Helseth, 2012) and authority is seen as concept which is closely allied with power (Osorio-Kupferblum, 2015). However, important differences between authority and power have also been highlighted, pointing out that the two concepts are not synonymous. ‘Power’ can be seen as coercive, while authority may result in encouraging another individual to voluntarily carry out a task or action (Osorio-Kupferblum, 2015). As the majority of participants describing attempts to influence are attempting to influence policy making from the point of view of an interest or research group, they are not in positions where they have any power to force policy makers to agree. This may suggest why participants seem to view authority as an important route to influence. Their path necessitates using information to encourage policy makers to voluntarily commit to actions.

The social nature of the world in which participants operate is crucial to understanding their perspectives on their sense-making journeys as they attempt to influence others. This is why the socially constructed nature of EBP which participants see themselves as engaging in is highlighted as the context of this theory and as core category. In practice, at the stage of influencing through sense-making, this social nature translates into the social nature of these key concepts of expertise, authority and credibility. At this stage in the theory of sense-making, the need to interact with and communicate with other people becomes really important for the participants.

Expertise has been described as a “social project” which depends on the ability of non-experts to recognise and appreciate expertise in others – this recognition by others seems to be a necessary condition before expertise can be said to exist (Watson, 2018). Credibility and authority are also thought to share a social or relational aspect. Authority has been described as *“an ability that consists essentially in another person’s action [...] a person is invested with authority by an agent through that agent’s action”* (Osorio-Kupferblum, 2015 p.227). In addition *“[A]uthority is a relationship involving at least two people [...] No individual by himself or herself can be an authority.* (Rieh, 2009 p. 1340). Authority is *“a relation among a bearer, a subject, a field”* (De George, 1985 p.77) Similarly *“Some credibility researchers who consider the processes of social endorsement to be crucial in credibility construction have proposed several variants of credibility including conferred credibility, tabulated credibility, and emergent credibility [...]. These forms of credibility suggest that people are not isolated evaluators of credibility as well as that social engagements and interactions must be considered in understanding credibility construction and assessment”* (Rieh, 2009 p.1339).

Both authority and credibility are therefore decided partly by individual perception and partly by group or domain perceptions. To begin with, authority is a relationship between at least two people i.e. the entity/individual being perceived as an authority (the bearer) and the individual doing the perceiving (the subject). However, the description of authority as a

relation between a bearer, subject and *field* suggests that conceptions of authority go beyond the initial two person relationship of bearer and subject. The same appears to be true of credibility if individuals do not make decisions about credibility in isolation. This could be taken to mean that the subject also considers what other potential subjects within their field think of an authority bearer.

In the first stage of the sense-making theory, where participants begin to integrate and evaluate information through their K-E frameworks (see section 8.4), the concept of authority was important to understanding how this first stage of sense-making occurs. However, in that earlier stage of sense-making, the emphasis was on the way in which the participants perceived authority of information themselves - whether their K-E frameworks led them to confer authority on that information. Now, at this later stage of the sense-making theory, the perceptions of authority among a wider group of people, all working within the context of EBP in public health also become important to the participants. They must try to consider whether they think other people are also likely to confer authority on communications which they produce as a result of sense-making and intend to share. The fact that the participants seem to connect concepts such as authority with an ability to influence others may also indicate that there is a link between the way in which information is viewed and the ability to influence others. Interview data also supports this view. Two of the quotes listed above show participants describing a need for 100% certainty with relation to information (participant 7, see p. 256) and the idea that information can be right or wrong (participant 11, see p. 256). It therefore appears that there are certain situations where participants may perceive a need for information to be 'right' and credible in the sense of being 'true' when they attempt to influence others. It can be inferred from this that the ability of information to predict phenomena within the social construction of objective science is important in some cases. Traditionally, information behaviour research has linked uncertainty to knowledge: "*Internal uncertainty can be thought of as uncertainty arising from a lack of knowledge*" (Kamal and Burkell, 2011 p.386). Knowledge is seen as the remedy to uncertainty, and it appears that

for participants', it is possible to reach a more specific understanding of this general statement and say that objective evidence is the remedy to uncertainty. If the existence of objective science and evidence is generally accepted by participants and those with whom they interact, it provides a forum and structure within which they can interact. Effectively it provides a shared language or medium through which influence can be enacted. The importance of shared language for the medium of influence has been highlighted in conceptual literature on influence (Parsons, 1963) Participants own belief in scientific objectivity, combined with the knowledge that this is a belief that is generally shared helps them to navigate through their working lives.

The acceptance of the existence of a certain shared view on what is considered to be objective places certain types of information in a privileged position, and consequently also tends to de-value other types of information – this is borne out by the tension around the usefulness of subjective forms of information which participants seem to experience (see chapter 7). However, an alternative world-view where all forms of information were accepted as equally possessed of claims to right-ness or equally rejected as lacking a good reason to believe in their objectivity and factuality might make completion of any task difficult due to the inability to choose between potentially conflicting paths. Participants and those with whom they interact need a mechanism through which information can be differentiated in order to avoid paralysis.

It may be the case that participants experience a de-valuing of more subjective forms of information as a result of a social preference for more objective information. However, this de-valuing is not complete, because, as illustrated in the previous chapter, participants may still make use of more subjective information. It is therefore important that this form of information be taken into account, including the way in which participants may use it to make sense of ways to influence others.

Based on the interview data, there seem to be two reasons why subjective information is still valued as a way of influencing others. Firstly, there are, what one participant referred to as

pragmatic concerns – essentially the more objective forms of information are not always available. Participants may therefore have to resort to more subjective forms of information. There is also a genuine recognition of the fact that subjective information, such as people's views and perspectives on their own lived experience can be very persuasive and have a significant impact on other people. There are potentially two ways of viewing the needs of a situation and two views of reality. The participants may take a scientific/rational view of reality, possibly perceiving this view to be more important to people they are trying to influence. In another case, they may view reality from a more emotive perspective, which prioritises the reality of the lived experience of others over rationality. The following interview quotations support the argument that subjective, lived-experience focused information is also used to attempt to influence decision makers and those in positions of power:

*“There’s a bit of evidence in the academic evidence, there’s a lot of personal experience, there’s a lot of, you know, political judgements, you know those are some of the – and there are some pragmatic attempts that are to do with the resources that are available. Quite a lot of the time I think, and indeed I think that some of the stuff that Sally Davies has put out recently, there’s almost a delusion that’s around, which is that we’re a very rational profession that takes actions that are primarily informed by in inverted commas, ‘scientific evidence’. That’s just not true.”*

(P8)

*“[...] when it comes to influencing policy makers, local politicians might not care about that, they want to know, what did my local people think?”* (P6)

*“Yeah, sometimes you need the expert testimony when the evidence just takes you so far, or it’s an implementation issue.”* (P13)

The interview data also suggests that participants may consider relevance as a criteria for determining the influencing potential of their sense-making efforts. Three of the participants' quotes have been selected to illustrate this:

*“I like the idea of dipping into various people and seeing what their knowledge is, it’s telling me two things, obviously what the information is, but also what they knew, do they care about it? Which I suppose is the ultimate aim, I’m really trying to say, if it’s important, how do you make sure it’s taken into consideration?” (P1)*

*“Um, I guess for us the response was on the more positive level in the fact that the student, you know they could re-submit, they could either do a new project or they could re-submit, so actually it did affect the feedback that we gave them, but I guess it was also a sense that um, you know, if we failed them then it was not going to be as horrific as it would be if they had to do it, if they had to re-do the whole thing. But actually, thinking about it, it did inform the feedback because when we gave the feedback back we were able to suggest that the student do this, this and this, and re-submit the project, rather than saying they do a whole new project, so in that sense we were able to perhaps soften it in a way. So it was useful, actually to know, because then there was the options, it wasn’t just clear cut, they could resubmit, or they could do a whole new project if we gave them a one.”(P5)*

*“So, what you get is you can have rational evidence, but at the same time actually one of the big players, and this exerts its pressure on local politicians is culturally what people actually feel would make a nice environment where they live.” (P8)*

The link between these quotations, ideas of relevance, importance and palatability and influential capacity are less well defined than those between objectivity and influential capacity. However, they can still be interpreted from the data. Participant 1 seems to indicate that understanding of the level of importance assigned to a given issue or information about a topic is helpful to them. Their words when they refer to making sure the topic is taken into consideration demonstrate their intent to exert influence in relation to that topic. Participant 8 makes a clear, direct connection between relevance and influencing potential. It can be inferred from their comment that because politicians see the views of their constituents as being of primary importance, information on those views will outrank any more objective



evidence. The relevance of information to the intended subject of any attempt to influence which is seen in the context of an emotive/lived experience view of reality being most important may therefore be something that participants take into account when assessing influential capacity during sense-making. For participant 5, an assessment of the influencing capacity of their sense-making effort could be construed as the way in which the participant is using sense-making to see the options for action in a more favourable light for the intended target of their influence. This particular participant had described a situation where they needed to present another person with a decision accompanied by several consequent options, none of which were likely to be that desirable to the person. Participant 5's comments on this situation indicate that developing an understanding of the options through sense-making was an important step in preparing to present their decision and outcomes to the individual.

It has now been suggested that different criteria may be used by participants to assess the influential capacity of their sense-making efforts in different circumstances. These different circumstances include the form of information with which participants began their sense making journey, and the person whom they are trying to influence. Criteria of credibility, authority, accuracy, quality are important in some circumstances, while relevance is indicated in other cases. To decide what is going to carry more weight, the participants must consider what view of reality is more important – a rational/scientific view or an emotive/lived experience view. The idea of 'relevance' for example seems particularly representative of the quote given by participant 8.

The substantive theory shown in figure 8-1 depicts the integration of information into subjective sense, and the way in which participants develop their capacity to use this sense to influence others in two discrete stages. However, the shared association between participants initial, personal integration and evaluation of the authority or relevance of information, and their need to consider the potential weight that information may carry with other people may mean that in many cases these two stages are collapsed into a single or

parallel trains of thought. It may be that because participants are embedded within a socially constructed sphere of EBP, they are conditioned to interact with information in a certain way, planning in advance for communications with other people. This means that even in situations where there is no immediate requirement to influence another party (such as the artificial situations created within the vignette exercises), the participants still approach assessments of information in a similar way. During vignette exercises, participants were not given specific instruction to consider how influential or authoritative they thought the information was, and yet in many cases they produced evaluative comments on the information when verbalising their thoughts.

Having arrived at a conclusion about the potential of information to help them to influence others through sense-making, the participants may then make use of a range of strategies to carry out this attempt to influence. These strategies and their connection to influence are encapsulated in the final theoretical code of the sense-making theory, discussed in the next section.

## **8.6 Communication with intent to influence implemented through paths to influence**

The final theoretical code which links the selective codes of 'Influence' and 'Paths to influence' is 'Communication with intent to influence implemented through paths to influence'. The strategies for influence used by the participants could be thought of as information use – the area of information behaviour which this research set out to study. Similar actions have been described as 'information use' previously, for example use of information to support justification (Kari, 2010). However, this label has been avoided because to use it would be to overlook the process of sense-making as a whole, which the substantive theory described in this chapter tries to represent for this particular group of participants. As discussed in chapter 3, one of the perceived difficulties with previous literature on the use of information in public health was a tendency to think of information as a 'thing' which is separate from the user. The implication is that use of that thing can be

easily observed as something that you can see an individual doing. Throughout the process of this research, there has been an effort to avoid that conceptualisation. What the proposed theory tries to make clear is that once an individual comes into contact with information, they are both changed by it and change it, as has previously been suggested by other researchers (Savolainen, 2006, Dervin, 1992, Dervin, 1983). The final stages of the proposed theory do not in fact represent 'information use' any more or less than earlier stages such as the stages where participants are engaged in evaluating and integrating information into subjective sense (see section 8.5). The wide variation in what may constitute use of information has been considered before as explained in chapter 4. With the sense-making conceptualisation of information use that this research has adopted, all of these earlier stages would also equally be seen as 'information use' because they are all part of the process of making sense.

However, in order for the link between those elements of the interview data represented by the selective code 'Paths to influence' and those represented by the selective code for 'Influence' to warrant its own separate step in the theory, something must differentiate them from earlier parts of the sense-making theory. 'Paths to influence' encompasses the open codes which represent situations where participants describe their planned or past interactions with others (see chapter 7 for full details). Therefore, this final element of the theory represents how the participants move from deriving potential influence through sense-making to communicating this. The final theoretical code represents the specific intention behind this sharing. The sense which participants develop through this process is not shared just for the sake of it, but specifically in order to influence others.

Selected examples of interview data which highlight a link between the strategies for sharing and communicating the results of sense making and the aim of influencing others include:

*"I like the idea of dipping into various people and seeing what their knowledge is, it's telling me two things, obviously what the information is, but also what they knew, do*

*they care about it? Which I suppose is the ultimate aim, I'm really trying to say, if it's important, how do you make sure it's taken into consideration?" (P1)*

*"helpful in that it... it will...support, sort of just provide further backing and support to the next steps of the project and show that, you know, we wouldn't have picked, um, the [...] just because, but that both [...], and that [...], so sort of a cross reference to say, this is why [...] So if particularly, mainly in any write up we would be able to say, this [...] was picked because x,y and z." (P2)*

*"So the purpose was, you know it was...the idea was to have a bit of a sort of teach-in, why, as additional framing to the ones we normally talk about, er, though we always talk about the impacts of [...] on [...] we haven't really honed it down into a specific ask, so it was, you know, firstly how do we make sure everyone is on the same sort of page and then secondly, how can we create a space in which we can use that information to help us create a policy ask. (P4)*

*"[...] so the reason we were so keen to find out what was going on [...] was because the group are at very, very early stages or you know, exploring what a possible coalition could be, [...] we also know that there's certain policies that we would like to see that need to be implemented [...] Therefore, you know, that was also going to help us decide what our scope was, and we would need them. We would need their support and it would be hugely beneficial to what we were both trying to achieve if we both endorsed each other's positions, or calls or things like that." (P7)*

*"Well I think the main one I suppose is the...I just, I'd have to look at some of the letters again, but you know, some of the main arguments has been around trying to make the case that what we have is a particularly, in [...], is [...] seeking to make the point that [...]" (P8)*

*"Yeah, so there's the very obvious thing of where there's little evidence around and where you're trying to make a case for something which you know, believe or, again*

*there is kind of evidence, but it's not really kind of robust and you know, trying to make that case, so I was in a meeting once with various kind of senior people from [...] where one of them said, commented you know, we like to say that we're evidence based but often we're kind of chasing an agenda with a kind of shred of evidence, hoping to get some attention to our particular issue.” (P12)*

*“So that's the sort of argument we're trying to make [...] that there will be, that the numbers as well as the prevalence, so we're talking about numbers and prevalence. [...] But it's, the idea is to build a case, with 'shocking figures' for the number of children that will be suffering these co-morbidities if nothing is done, and therefore to strengthen the argument that governments really should act if they don't want to see this unfolding.” (P14)*

These quotations share an underlying intent to persuade, as well as highlighting several different tactics for carrying out persuasion. The idea of argument appears in several of them, for example one participant actually uses the word 'argument', others talk about wanting to get attention, or creating an 'ask' or a 'call'. The idea of 'asks' or 'calls' in public health may relate to 'policy asks'. As described in chapter 6, several of the participants work in areas where they are engaged in attempting to influence government policy.

Conceptual literature strongly supports the connection between the idea of arguing for something and attempting to influence others. This is despite the fact that, as with so many of the concepts dealt with in this research, argumentation has no clear definition (O'Keefe, 2012). However, it appears that conceptually, argumentation or arguing includes an intent to influence as part of its definition. These definitions on offer include:

*“the art of producing in the mind of another person acceptance of ideas held true by a writer or speaker, and of **inducing** the other person to make a decision, or, if necessary to perform an act in consequence of this acquired belief” (Baker and Huntington (1925) p.6-7 cited in O'Keefe (2012), p.20).*

*“as verbal, social, and rational activity aimed at convincing a reasonable critic of the acceptability of a standpoint by putting forward a constellation of propositions justifying or refuting what is expressed in the standpoint”* van Eemeren and Grootendorst (2004) cited in Labrie (2015 p.47)

Argumentation literature draws a distinction between influencing mental states, thoughts and feelings and influencing actual acts and behaviours (O'Keefe, 2012). The academic study of argument through argumentation theory still uses the three main dimensions of argument proposed by Aristotle: *“analytic (logical argument using premises based on certain knowledge) dialectic (debating to argue for and against a standpoint) and rhetoric (the use of **persuasion to influence the thought and behaviour of one’s audience**)”* (Russell et al., 2008 p.41). Argumentation therefore can be broadly understood as attempts to influence thoughts and actions.

There are also clear conceptual links between the idea of ‘framing’, another of the strategies for sharing the results of sense-making. Problem framing has been described as *“how different people often have different ways of thinking about a problem, and their various perspectives are enmeshed in the way they define, present, and examine that problem [...] Frames are often tied to disciplinary perspectives, ideologies, or particular historical or political contexts”* (Rychetnik et al., 2004 p.543). Decision framing literature in health concentrates on the decision makers perception of the contingencies and outcomes associated with choices (Tversky and Kahneman, 1981). Individuals are thought to adopt different decision making frames according to their personal and social characteristics (Tversky and Kahneman, 1981). Despite frequent references to the concept of framing (e.g. as message-framing, framing effects, gain oriented and loss oriented framing) in social science and psychology literature, it is surprisingly difficult to find a clear and specific definition of what framing actually is. It has been said of framing that *“Despite its omnipresence across the social sciences and humanities, nowhere is there a general statement of framing theory that shows exactly how frames become embedded within and*

*make themselves manifest in a text, or how framing influences thinking*” (Entman, 1993 p.51). Framing does appear to be connected to influence as *“Analysis of frames illuminates the precise way in which influence of a human consciousness is exerted by the transfer (or communication) of information from one local [...] to that consciousness”* (Entman, 1993 p.51).

There is also literature connecting framing to argumentation and to different levels of human reflection and understanding of the purpose of argumentation. On one level, framing can simply refer to an individual’s understanding of what is happening in any given situation (Berland and Hammer, 2012). This may be thought of as a schema of expectations and predictions about that situation, based on knowledge of previous experience (Berland and Hammer, 2012). In terms of argumentation, framing can therefore be understood as how individuals view the nature of an interpersonal situation of arguing in general. For example, do they see the purpose of the argument as being to obtain an advantage, for entertainment, to display dominance or for purposes of displaying a facet of their identity (Hample et al., 2008). Beyond this, at a second level, framing can be about whether one individual involved in argument recognizes the motives, needs and plans of another party involved in the argument. If the other parties in the argument are recognized in this way, this creates an opportunity for the arguer to adapt or alter their argument in some way so as to take account of the other party’s reality (Hample et al., 2008).

Literature on argumentation and framing is informative in understanding participant experiences in two ways. Firstly, it highlights the different perspectives which individuals may take on an argument (how they frame arguments). The literature suggests that argumentation may be seen in a rather crude light where individuals think only of what they want and how to get it (Hample et al., 2008). Alternatively, some individuals may take a more sophisticated view of argument, one in which they attempt to recognise and take account of the motivations, views and needs of others involved in an argument (Hample et al., 2008).

This more sophisticated approach may allow for editing of an argument to allow for those

needs (Hample et al., 2008). In the quotations presented above, participant 4 talks about presenting their policy asks in a way that makes them seem more relevant to current politics, which they refer to as framing. It is therefore suggested in light of theoretical literature on argumentation that to this participant, framing is a way of editing their argument so as to take into account the needs and motivations (the priorities) of the current government. It is logical to assume that the participant's aim in doing this is to make it more likely that the government will act on their asks by making it appear that to do so would be to their own gain as well as to the gain of the participant. This implies a persuasive element to framing, and a connection to influence.

Two of the strategies for sharing sense-making outputs, 'Framing' and 'How do we make sure everyone is on the same page' seem to share this more sophisticated approach to arguing. In cases where these strategies have been applied, the participants seem to have gone to some effort to consider the issues of importance to those they seek to influence and then look for a way to incorporate those issues into their sense-making process and communications. This kind of shared effort at sense-making was demonstrated by participant 4:

*“So, and we also talked to [...], and [...] had a briefing on kind of [...], although a lot of that was more about sort of development issues, there was a chunk that was useful, so we circulated that as a source of information to people in advance. So the purpose was, [...] to have a bit of a sort of teach-in, why, as additional framing to the ones we normally talk about, [...] so it was, you know, firstly how do we make sure everyone is on the same sort of page and then secondly, how can we create a space in which we can use that information to help us create a policy ask.” (P4)*

It is logical to assume that in order to conduct these sophisticated methods of argument, participants may either need to draw on their existing frames of reference of EBP, and possibly also to gather new knowledge in order to understand what might be most relevant to those they seek to influence on each new occasion.



Interestingly the concept of 'truth' also arises once more in amongst these various conceptualisations of influence and persuasion. Truth features in understandings of influence and persuasion, in the sense that a mental state outcome of these activities may be to persuade or influence someone that a specified belief is 'true' (Blair, 2012). Apparently argument, or the art of persuasion also relates to the concepts of credibility and authority, as those putting forward arguments attempt to integrate these concepts into their arguments (Russell et al., 2008). The conceptual discussion of 'Framing' in the previous paragraph proposes that those using more sophisticated argumentation techniques will attempt to recognise and appeal to the values and motivations of those they seek to persuade. This could also be understood as an attempt to understand what is most relevant to that individual. These points relating to different communicative strategies for sharing sense-making efforts with a view to influencing others are mentioned because they highlight links to the concepts of credibility and authority which are important in other stages of the sense-making theory described in this chapter. The appearance of these concepts again, at this sharing and communication stage of sense-making may provide some explanation as to their importance earlier on in the sense-making journey.

The idea of 'truth' or objective, factual information appeared repeatedly throughout the analysis of the interview data. It has been suggested that participants adhere to a socially constructed idea of objective science and expect to find objective information produced by that science. It has also been suggested that this social construction is necessary to the participants as it provides a set of shared rules with which they can navigate their tasks and situations. Expectation and knowledge that others share in this construction allows the participants to better predict the outcome of their sense-making efforts, and perhaps modify their communications accordingly. The idea that attempts to influence others can be equated with attempts to persuade them that something is 'true' underlines the importance of the social construct of objective science for participants. How much easier to influence another

person if you can do so by using science that is assessed to be objective according to a standard which you can expect the target of your persuasive efforts to share?

Rational persuasion is a related concept to argumentation (Blair, 2012), and involves using grounds that are “*at least minimally credible and have some measure of pertinence as reasons for that target change in mental state, and the manner in which the grounds are used must engage the intellect of the persuadee so as to evoke his or her conscious and deliberate consideration of the ground and their bearing and force in support of the target change in mental state*” (Blair, 2012 p.75). The links between credibility and authority or expertise have already been discussed earlier in the chapter. Pertinence may be similar to relevance. It is possible that these criteria of relevance/pertinence, credibility/authority and objectivity are important throughout the sense-making process because the intention to influence others requires attention to these criteria. Personal influence held by individuals within organisations is also thought to result in sense-making efforts communicated by those individuals having greater impact on others (Senier et al., 2018). This final stage of the proposed sense-making theory therefore highlights the importance of understanding what participants look for in information at earlier stages. These concepts feed into and enhance the participants’ communication and sharing of the results of their sense-making efforts. The term ‘sense-giving’ has been used elsewhere to describe the communication of the results of sense-making, and refers to a similar kind of behaviour in that it describes attempts to influence the sense-making efforts of other people (Maitlis and Christianson, 2014).

Rational persuasion and argumentation can form elements of conversation, which can be thought of as a tool for joint sense-making within organisations, where conversation may include presenting justifications or legitimations (Jordan et al., 2009, Senier et al., 2018) and where individuals may attempt to use their sense-making efforts to persuade their colleagues of something (Senier et al., 2018).

Returning to the specific strategies for influence noted in the interview data, these strategies can be divided into pro-active and defensive strategies. This distinction is made because

there are some instances where participants seem to be preparing themselves for external scrutiny – this was discussed in chapter 7. It is this preparation for and expectation of scrutiny which lends a defensive air to some instances of enactment of sense-making. Of the quotes above, participant 2 is an example of this. In other cases, including some of those described as ‘case-building’ or ‘case-making’, the activity of communicating the results of sense-making to others seems more pro-active. It is as if there are certain situations described by participants which depict the participants as feeling able to move to a more definitive, positive position as a result of sense-making. Participant 14 (see p. 265) and perhaps also participant 4 (see p. 268) above are examples of this. It is possible that this difference between the communication of sense taking on a defensive or pro-active cast may lie in the level of responsibility which the participant may perceive themselves to bear in the communication. This is especially relevant to situations where participants have to make decisions or recommendations as an outcome of their sense-making process. In the case of participant 2 (see p. 264), decision making included decisions about who to involve in a research project, i.e. who to interview. Situations where participants’ communications may be viewed in a pro-active light may be those situations where they are focused on calling attention to something, without actually making recommendations to remedy a problem or issue. Participants 4 and 14 are particularly good examples of this. Participant 4 actually stated at one point during interview that they were not attempting to suggest solutions for the problem they were drawing attention to. Participant 14 was very focused on ‘shocking’ those whom they were trying to influence, building a moral case for action. However, they did not make mention of specific courses of action that should be taken – instead they were engaged in making dire future predictions with a view to encouraging some action to avert that future. The reason for this difference may lie in the difference in level of responsibility which participants perceive in different situations. Calling attention to a problem without suggesting specific actions to remedy it logically seems to hold a lower level of responsibility and risk for the individual involved than making a series of recommendations for actions that you claim will resolve the situation would. Once again, similar ideas are seen in

organisational sense-making, where conversations that drive sense-making can include elements such as story-telling, offering possibilities and describing problems (Jordan et al., 2009), and sense-making includes the drawing of conclusions about relevance between different topic areas and using information or data to illustrate the importance or applicability of an intervention (Senier et al., 2018).

It is also thought that availability or authority of information might be an important deciding factor in whether an argument should be made at all. Arguing for something which you knew you had only limited evidence for might be risky, if this meant that your argument could be attacked through the back door by criticism of its supporting evidence base.

Several of the participants (participants 1, 4 and 14) described activities that seemed to be geared toward gaining the attention of the people that they were communicating with. These quotations were originally grouped under the code for 'In order to get some headlines' as discussed in the previous chapter. During the course of the more conceptual stage of analysis narrated in the present chapter, a direct link between this code and the code for framing began to emerge. Examination of literature on argumentation as an academic field of study, and argumentation as seen by those involved in public health opened up a suggestion that the tactic of attention grabbing during communication might in fact be another form of framing, or a more specific type of argumentation.

Two of the participants who talked about using headline grabbing tactics (participants 1 and 14) had described using information to illustrate the negative impacts of inaction. Literature on framing refers to two forms of framing during communication – gain-framed and loss-framed appeals (Corner and Hahn, 2010). "*A gain-framed persuasive appeal emphasizes the advantages of compliance with the communicator's recommendation or viewpoint, as contrasted with loss-framed appeals, which emphasize the disadvantages of noncompliance*" (O'Keefe and Jensen, 2007 p.623). As participants seemed to be attempting to emphasise negative consequences on population health in cases where some

form of action were not taken, these appeals could be seen as loss-framed appeals, based on the definition quoted above. Participant 14 provided a particularly clear example of this: “[...] in order to get some headlines I’m trying to generate projections of [levels of risk factor] likely to be found in the world if nothing changes [...].” (P14)

Gain and loss framed appeals are seen as forms of communication used in situations where there is an attempt to persuade. This provides a further link between headline grabbing tactics, framing and influence through the underlying desire to persuade. Literature on argumentation in public health also describes the use of a similar sounding tactic, although it is referred to as pragmatic argumentation rather than as framing: “*argumentation that is particularly prevalent in public health messages is pragmatic argumentation, in which a causal reference is made between the action described in the standpoint and its – positive or negative – consequences*” (Labrie, 2015 p. 47).

The interview data has highlighted the existence of several different strategies or tactics in which participants engage during the communication stage of the sense-making theory described in this chapter. Conceptual literature has been used to advance understandings of these tactics. All of these tactics involve interactions not only with information, but also with other people. The process of theoretical coding enabled the positioning of these tactics within the social construct of evidence based practice. The use of these tactics as attempts to influence others can be seen as arising from attempts to engage in evidence based practice because these tactics are in fact ways in which the participants are communicating and demonstrating their understandings of and applications of evidence based public health practice.

## **8.7 Conclusion**

This chapter has presented a substantive theory of sense-making as observed in the participants in this research. This theory outlines the way in which participants existing individual frameworks of knowledge, experience, perceptions and preferences affect their

reception of new information. The theory attempts to depict the interaction of individual participants with the world around them, in order to achieve specific goals and/or navigate their way through specific tasks and situations narrated during interview. This process is challenging to abstract to the conceptual level required to create a theory because it is complex and highly individual. It is also challenging in terms of choosing the correct terminology to describe the theory and because of the related and underlying challenge which comes from the apparently contradictory nature of the way in which participants experience interacting with information. On the one hand, the data supports the view that all participants experience the act of sense-making differently because of their individual differences. Differences in reaction to the same pieces of information by different participants were observed during interview, and have been linked to the participants differing knowledge and experience of public health work. Participants themselves also on occasion admit to being aware that personal preferences and biases affect how they interact with information. On the other hand, participants also make comments which suggest that they perceive the existence of 'objective' information, as they make reference to 'facts' and information being right. There are instances where they seem to actively seek out this information. The question of how participants reconcile this duality in perspective of their interactions with information (assuming that this is possible) would be a fascinating topic for future research. Sadly it is not a question that the present research is able to answer, and may be a subject more suited to psychological or behavioural researchers. However, the present research has achieved something in that it has highlighted the existence of this duality. It also functions to add some detail to our understanding of how individuals interact with information in public health, by drawing attention to the importance of the distinction between subjective and objective forms of information to participants. It has also added detail to knowledge of the processes participants move through to make sense of their situations, including the evaluative nature of this process and the breadth of considerations that 'evaluation' includes. Lastly the present research also adds detail to our understanding of how sense is

communicated to others in public health, providing a new understanding of what it means to engage in evidence based public health practice.

The next and final chapter will highlight in more detail how the present research has contributed to an enhanced understanding of information behaviour and information use in public health by discussing these findings in the context of previous information behaviour research and theories. This will include a reflection on thinking in the field of information behaviour, the way in which we apply terminology to the concepts of information and knowledge, and whether it is time to reconsider how appropriate this terminology really is.

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## **9 What this research adds to existing knowledge on information use behaviour**

### **9.1 Introduction**

Chapter 8 presented a substantive theory of the sense-making behaviour of the participants of this thesis, describing how those participants interact and communicate with information and other people. This final chapter will now turn to exploring the impact and implications of this research, beginning with some thoughts on the key messages of this research for three groups: public health practitioners, LIS information behaviour researchers and librarians and information professionals providing information services in public health.

For public health practitioners, this research provides an alternative way of understanding evidence based practice and evidence. Chapter 8 presented evidence based practice (EBP) as the core category for the substantive theory developed, depicting EBP as a socially constructed way of interacting with information and other people. This interaction requires individuals to construct evidence and communicate it to other people with the goal of influencing those people. Evidence itself is a construction created by participants using the ideas and knowledge they discover in combination with their own existing ideas and knowledge. Construction of evidence is undertaken specifically to meet the demands of each situation or task encountered. This contrasts to the more common view of EBP as the practice of basing decisions on evidence, in which evidence is often seen as a bordered, relatively objective entity, albeit a disputed one. Many articles and research papers have discussed the concept of evidence for public health (see Abeysinghe (2013), Oliver and de Vocht (2015) Petticrew and Roberts (2003), Li et al. (2015), Banta (2003) Brownson et al. (2009a) for examples). The number of articles on this subject in itself indicates that evidence has been something of a problematic issue for public health practitioners. The view argued in many publications on this topic revolves around the inappropriateness of the evidence based medicine hierarchy of evidence, because this hierarchy is centred on effectiveness of

interventions. For public health it is argued that it is more useful to first consider what type of research is most appropriate to answer the kind of complex questions encountered (Abeysinghe, 2013), to allow a broader range of types of information as evidence (Petticrew and Roberts, 2003, Brownson et al., 2009a), or that we don't know what types of evidence are being used by practitioners and policy makers and must find out (Oliver and de Vocht, 2015, Li et al., 2015). Throughout this literature, evidence continues to appear as a bordered entity, as the focus is on what *type* of evidence should be admitted for public health. Public health practitioners might find a way to resolve the seemingly problematic issue of what type of information constitutes evidence by setting this discussion aside in favour of a reframing of the concept of evidence as a constructed, dynamic phenomena that exists only in the way in which individuals establish connections between information and outcomes or decisions. Evidence is seen as the connection, not the information in this scenario.

For information behaviour researchers, the key messages include the need for clarity in what we actually mean by information behaviour, and a continuing need to see individual behaviour in the context of the social groups to which individuals belong. This thesis also indicates the relevance of perspectives on information behaviour which acknowledge that this behaviour is not about individuals interacting with a static information object. Information behaviour should clarify whether the primary field of interest is in the interaction of individuals with information objects and systems, or the interaction with and communication of the ideas and knowledge contained within information objects. The thesis indicates that there is benefit to be gained from adopting sense-making perspectives on information use. In the present thesis, this has been used in combination with Grounded Theory to generate a substantive theory which provides new insight into information use in a particular group. Further explorations of information use framed within sense-making may be able to generate further understanding of this phenomena in other groups.

For information professionals working in public health, there are some practical implications and key messages to consider. Information professionals have been keen to adopt the

model of Evidence Based Practice (EBP), as this model indicates a clear role for the profession in supporting health workforces, e.g. with the use of specialist skills in information retrieval to provide evidence and support the creation of systematic reviews, with support in critical appraisal of evidence, and through instruction on information literacy skills. However, as a profession we tend to provide this support without questioning the important underlying assumptions about the nature of what we are providing – evidence. Given the prominence of the concept of evidence in public life it is surprising to note that the term hardly appears in key information literacy frameworks and definitions used in the UK, including the SCONUL Seven Pillars (SCONUL Working Group on Information Literacy, 2011) and CILIP's recent definition of information literacy (IL) (CILIP, 2018). The CILIP definition of IL is described as being in line with National Curriculum requirements which include the ability to weight evidence and sift arguments, however no more is said about the nature of evidence within this definition (CILIP, 2018). The word evidence does not feature at all in the information literacy skills set out by the SCONUL Seven Pillars. The substantive theory presented in this thesis sets out the way in which the individual participants construct evidence by integrating and evaluating ideas and knowledge that they encounter. These participants actively consider concepts of authority and relevance and use their existing knowledge and experience of the expectations of public health as a domain and of the reactions and opinions of those whom they intend to communicate to construct evidence that they believe will be most persuasive to those people. It is suggested that the ability to make judgements about the authority of ideas and knowledge, their relevance to a situation and the ability to use this to construct evidence requires the same skills as those presented in IL frameworks. Information professionals working in public health and related areas should consider what role they can play in helping those they are supporting to better understand the concept of evidence and its relationship to information literacy. In a situation where, as for public health, defining and understanding evidence has proved problematic, information professionals may be able to lend support by helping to clarify the key concepts of knowledge, information and evidence. If, as this thesis suggests, evidence can be seen not as an objective entity but as

an individual construct within a specific time and space, information professionals should consider how they can support public health practitioners in understanding and communicating the processes of construction that lead to creation of evidence.

An important task in considering how the present research relates to information behaviour is to consider how the substantive theory proposed in chapter 8 compares to existing models and theories of information behaviour. In one sense, this comparison is easy because most of the existing well known models of information behaviour developed by researchers such as Wilson (Wilson, 1981, Wilson, 1997), Ellis (Ellis, 1989) and Kuhlthau (Kuhlthau et al., 1990, Kuhlthau, 1991) are essentially models of information seeking. In the main these models make only vague references to information use. Kuhlthau refers to 'presentation' as one of the stages of her information search process, which could equate with communication and use. Only one of Wilson's models (Wilson, 1981) contains specific mention of the term information use, wherein information use is represented as a single element of a larger process of human information behaviour – possibly because the model functions as a map of the totality of human interactions with information (Wilson, 1999). As Wilson himself points out, this kind of macro level model of information behaviour can complement and be complemented by models which deal with specific areas of information behaviour such as the information seeking and searching models proposed by Ellis and Kuhlthau. Wilson authored a 1999 research paper dedicated to highlighting how these various models complimented each other (Wilson, 1999) – however Wilson was unable to draw in any models of information use presenting a similar level of detail in their representation of human behaviour. For reasons that are unclear, his paper does not reference Taylor's Information Use Environment theory, which had been published several years previously in 1991 (Taylor, 1991). However, as will become clear, the relationship between the process proposed in chapter 8, and existing models of information behaviour is more complex than just the ability to fill a gap by providing a new model of information use. In fact, the most important question which is asked at the end of this thesis, is what kind of behaviour has

been modelled, and whether this should be referred to as information use at all, or as something else entirely. The remainder of the chapter will explain the reasoning behind this question, attempting to explore relationships between this sense-making process and information behaviour, and in doing so to further enhance the understanding of the behaviour which the proposed process describes.

## **9.2 Changing perspectives: Information behaviour or interactions between individuals, communications, sense and ideas?**

In some of the models and theories of information and information behaviour referenced in earlier chapters, humans are seen as interacting with a thing-like entity that is information (Bates, 2006, Brookes, 1980), while other models describe information in more personal terms, as sense, experiences, mental states or opinions (Wilson, 1981, Bates, 2006, Brookes, 1980). The idea of information as an objective 'thing', seems to be the conceptualisation which has been carried through into previous public health information behaviour research, as evidenced by the focus on survey designs and counting of users and uses of books and retrieval engines (see chapter 2). Research utilization literature from public health contexts tends to consider the conceptualisation and purpose of information in greater detail (see chapter 3), hence the use of categorisations such as conceptual (use for enlightenment) and symbolic (use of legitimating a position) (Amara et al., 2004). There also seems to be more attention in research utilization to the interaction between individual and research, exemplified by the development of schema for measuring research use. One example includes a continuum of research use, where conceptualisations of research use include: *"Research indirectly informs a core orientation toward an issue or a basic understanding of the issue"* (Lemay and Sa, 2014 p. 81), and *"Research is used to confirm or strengthen an orientation or an understanding that has already been adopted"* (Lemay and Sa, 2014 p. 81). In another example, a 7 stage model of research utilization begins with reception, where policy makers or advisers receive a communication which *"comes to rest in the 'in-basket', so that the data 'reach' the policy maker"* (Knott and Wildavsky, 1980 p.



546). This may be succeeded by cognition, where the policy maker “*must read, digest and understand*” – this, it is said, is enough to result in utilization (Knott and Wildavsky, 1980 p. 546).

The outcome of this thesis differs from these previous instances of research in that it moves away from understanding behaviours that are about people interacting with entities, and instead highlights what happens within processes of interaction between people and ideas, and the way in which the very processes of interaction negate the relevance of information-entities. Although research utilization conceptualisations of interactions between people and research do refer to interactions more so than many conceptualisations from information behaviour, they talk in terms of people and separate entities. These entities are described as ‘information’, ‘research’, ‘knowledge’ and occasionally ‘data’. The language used around this entity, whatever label is applied, suggests that it has a life of its own. Even where models such as the 7 stage model do include some reference to the dynamic nature of interactions between people and ideas, they tend to slip back in to talking about people interacting with entities at later stages. Some direct quotations from this model illustrate this. Early stages include the following description, which seems to recognise the dynamism of the interaction between individual and idea (referred to in the model as ‘information’): “*If frame of reference is the criterion, then utilization must change the way the policy-maker sees the world. If information changes his preferences [...] utilization is a reality. Altering frames of reference is important because, in the long run, the policy-maker’s new vision will show up in different policy priorities*” (Knott and Wildavsky, 1980 p. 546). However this recognition seems to be lost in the subsequent stages, as evidenced by continued references to ‘information’: “*To make a real difference, information must influence the actions of policy-makers*” (Knott and Wildavsky, 1980p.546) “*What is essential is not whether policy-relevant information is an input to the policy process [...] but whether it goes on to influence policy outcomes*”, and so on (Knott and Wildavsky, 1980 p.546).

Wilson's models of information behaviour also depict information as an entity moving through a process. Throughout diagrammatic representations of these models, information is shown as a bordered entity which flows through the model from realisation of need to seeking and potential transfer to others (Wilson, 1999). Taylor's Information Use Environments (IUE) theory includes categorisations of use, which also present information as a thing, including use of information to understand the general background to a situation or problem, to solve a specific problem, to find out how to do something, to verify something known by the user, to determine or estimate probable future outcomes, to motivate and to affect or alter relationships (Taylor, 1991). So from the existing information behaviour and research utilization models described above, we may understand that it is 'research' that informs a policy position, 'information' on which a decision is based, or which changes an individual's thinking. This kind of language can be found throughout literature on research utilization, with examples such as "*expectations of program evaluators and university researchers were that [...] policy decisions should always be based on research evidence.*" (Amara et al., 2004 p. 76) ; or "*information has been received, understood, and it has led to some concrete action, even if that action is to reject the information.*" (Rich, 1997 p. 15).

Following the development of the substantive theory presented in chapter 8, and reflecting on the pre-existing models of information behaviour, the pre-existing models present problems both in how they conceptualise information behaviour (as people interacting with things) and information (as a thing with a life of its own). In each case, descriptions of use and the terminology 'information' can lead the reader to overlook or miss the realisation that firstly, information on its own can accomplish nothing. As the process presented in chapter 8 indicates, people are needed to interpret information, and they do so subjectively. Secondly, what we are really often talking about when we talk about 'information' use, is about the way in which we communicate with each other and interact with the ideas and understandings developed by other people - this is not about interactions with static information. The terms 'idea' and 'communication' are now used throughout this chapter in an attempt to indicate

that individuals do not interact with something static - they interact with dynamic ideas which are products of other interactions. The participants in the present research are using entities which have passed through the hands and minds of other individuals before them. All of these entities have come into contact with or have originated from humans and they have been shaped by those humans. Even those entities which are traditionally presented as being 'pure' or 'raw' such as data have been shaped by humans because a human has made a decision about what data to gather, how to measure it and how to collect, store, organise and present it. Instead of being about interactions with static information, the model presented in chapter 8 is about how the participants interact with communications and ideas that have been shaped, made sense of and created by other people. The debt which this idea owes to Dervin's 'sense-making' (Dervin, 2003c) should be made clear. Sense-making has been linked to information behaviour research previously as others have interpreted sense-making as "*approaching information use metaphorically in terms of gap bridging*" (Kari, 2010) (see also (Wilson, 1999) for reference to sense-making as a model of information behaviour). The way in which sense-making conceptualises 'information' is to call for an understanding that information is created by individuals (Dervin, 2003c). This is essentially the conceptualisation that is also suggested by the present research. Sense-making offers a meaningful conception of how we interact with other people and the ideas which they generate, and used as a frame of reference for research into how groups of individuals interact with and communicate with each other can allow information professionals to better understand the users whom they serve. The relevance of sense-making to information use has previously been questioned partly because of the difference in vocabulary between information behaviour and sense-making (Savolainen, 2006). It is argued that rather than questioning the relevance of sense-making to information use, we should recognise that sense-making is helpful in understanding how individuals communicate with each other and reach understandings of the world, and that this is in turn helpful for information professionals to gain a more complete picture of who our users are, the problems they face and what is important to them.

It has been suggested that the theoretical task of library and information science should be to study the interactions between the worlds of subjective mental states of individuals and the world of objective information (Brookes, 1980). That suggestion represents the kind of person with entity interaction which this thesis has moved away from. This is not to say that such studies are not valid, useful and interesting. However, the thesis seeks to make the point that as information professionals seeking to understand the users with whom we work, it is also important for us to understand how these individuals communicate with each other, and with the ideas which are produced and communicated within the users' domain.

Terminology is an important part of defining the various fields of research which this thesis has touched on, and terminology is also important as part of this attempt to highlight how the thesis differs from existing research and contributes to understanding of how our users behave. Terminological challenges of information behaviour and use were noted in chapter 4, and when defining this thesis as studying interactions of people with ideas and communications rather than with things, it is difficult to move away from using terms such as 'information'. It is easy and perhaps habitual to think of ideas and communications as things, and therefore slip back into thinking about interactions between people and entities. It has been said that "*there is nothing natural about [information]; information has always been designed*" (Foreman-Wernet, 2003 p. 6 ). This implies creation, dynamism, change and interaction in and of itself. One thing which this thesis has attempted to explain is that individual research participants interactions with the ideas and communications around them were subjective, resulting not in the production of a thing, but in the production of a state of mind, or 'sense' unique to that time, place and individual, as suggested by sense-making (Dervin, 2003b). If information does exist as an objective thing, then 'information' is not what this thesis is about, and we should not be referring to 'information' when discussing human interactions with the communications, ideas and understandings produced by other humans. The development of and interaction between person and ideas, or alternatively communications and sense as suggested by Dervin (Dervin, 2003c) are the terms which best describe the subject of this thesis. It is for example, the end result of an individual's

interaction with the ideas and sense created by the interactions of others before them which inform a policy or help to make a decision. There is no place for an objective 'thing' in this process. The basis for the state of mind reached, or the decision or action made is always a joint effort between person and sense, communication or idea. This end result is not a 'thing' but a state of mind for an individual.

There is a danger that without careful attention to the conceptualisation of what is being studied in information behaviour research, and alternately in studies of communications between people and ideas (such as this thesis), there will be confusion about how the results of such research can be applied. It is worth remembering that some of the most well known work on information behaviour does not necessarily define itself as being about interactions between people and ideas, but instead may be more about people interacting with systems. This may be one reason why, as discussed above, some have questioned the relevance of sense-making to studies of information use. If information use studies are primarily conducted to determine how people interact with systems, then perhaps sense-making is not relevant. This has certainly been the case with some important studies of other aspects of information behaviour. For example, Wilson discusses information seeking as representing *"search paths that may be used by the information seeker directly or used on his behalf by the information system and its subsystems"* (Wilson, 1981 p. 6). Wilson also points out that *"our motives for investigating search processes may be to make inferences about need, or it may be to uncover facts relating to other variables related to the design, development or adaptation of information systems."* (Wilson, 1981 p. 7). Similar motives are seen in some of the other well known models of information behaviour, for example the paper which presents Ellis' model of information seeking is in fact titled *"A behavioural approach to information retrieval system design"* (Ellis, 1989 p. 171). Kuhlthau's information search process model also seems to have been intended to inform the development of information retrieval systems (Kuhlthau, 1991). These are important aims in improving the experiences of information service users. However, it is important to make clear that this is a different field

of study to that which has been covered in this thesis. This means that we should not rely on such models of information behaviour to help us to understand how individuals who use information services communicate and share ideas with each other and what they actually do with the ideas and communications they find following interactions with systems. To understand these experiences, theories of communication and sense-making such as the substantive theory proposed in this thesis will be more helpful.

There is also a danger that, unless conceptualisations of the behaviour being studied are made clear in future research, information will be seen as something which in and of itself can affect change and be held responsible for outcomes in the world. This thesis has attempted to highlight that this is in fact not the case. We, as individual actors who communicate and share ideas with each other bear the responsibility for any outcomes of those interactions. While it is perfectly possible to pass on a hard copy of a report or email a PDF to a colleague because you think they might find it useful, and for that colleague to reach a decision based on that PDF, there is still an element of influence of the person doing the transferring and of the recipient. To fit the process of interaction and construction of meaning and sense which participants in the present research were interpreted as undergoing, models of behaviour should make clear, as the process presented here attempts to do, that the development of sense and understandings of our situations are not about things. The ideas that we come into contact with are not things because they have been dynamically generated by other individuals. Instead of an entity understood to be objective information, we are left with the unique individual 'knowledge' or 'sense' that the hypothetical policy maker or advisor referred to in the model has created at that point in time.

### **9.3 Evidence as a sense-making exercise**

An understanding of evidence, and evidence based practice proved to be important factors in the development of the sense-making theory presented in chapter 8. The development of an understanding of the role and value of evidence and evidence based practice is another contribution to our knowledge of how individuals in public health interact and communicate

with each other which this thesis can make. As with 'information' and 'knowledge', this thesis has highlighted that there are many conceptualisations of 'evidence' (see chapter 8). This thesis indicates how conceptualisations of evidence might relate to understandings of concepts such as 'information' and 'knowledge' and provides insight into how important the conceptualisation of evidence might be for the study of interactions between people and ideas.

As discussed in chapter 8, evidence is usually seen as something that provides grounds for belief, information that we have to 'go on'. In public health, language used around evidence indicates the view that it is a 'thing', consisting of certain types of document or publication. It is clear both from the participants' experiences, and from literature on evidence based public health that the discipline has struggled to reach agreement on what types of knowledge constitute valid evidence for public health practice. This debate usually centres around tensions between the importance of hierarchies of evidence (Nutley et al., 2013), contextual knowledge as well as research evidence when making public health policy decisions, and whether it is right to privilege formal research above other types of information or knowledge. Evidence for public health has been described as consisting of scientific information from peer reviewed journals, data, program evaluations, qualitative findings from participant observations, group interviews and focus groups (Brownson et al., 2009b), and it seems that there is little agreement over what public health evidence is (Li et al., 2015). Alternative approaches concentrate on typologies of research. One typology lists qualitative research, surveys, case-control studies, cohort studies, RCTs, quasi-experimental studies, non-experimental evaluations or systematic reviews (Petticrew and Roberts, 2003). In another example, 3 main types of evidence are presented – descriptive evidence which indicates the presence of a health problem, associated with data; evidence of what interventions will work to address the problem (associated with qualitative or quantitative evaluations of intervention) and implementation evidence, which is produced through process evaluations

(Armstrong et al., 2014). The very idea of grouping evidence into types includes viewing it as a series of definable, classifiable things, much as has often been the case with information.

This thesis suggests that evidence would be better viewed, not as a thing, but as a concept that represents a specific way in which an individual may interact with the ideas and communications of others. This way of thinking is defined not by characteristics of evidence as an entity, but by the purpose for which individuals interact with dynamic ideas shared by others. Sense-making suggests that individuals move “*cognitively through time-space using whatever sense [they have] already constructed based on personal experiences [...] sense frequently runs out. A gap is identified. The human must build a bridge across the gap. In doing so, the human will answer questions, create ideas and/or obtain resources*” (Dervin, 2003a p. 224). Metaphorically, sense-making is presented as a way of bridging gaps in experience. If humans communicate with each other in order to make sense and smooth their passage through their worlds, then the idea of ‘evidence’ as seen in the present research could represent, not a ‘thing’, but a particular strategy of sense-making or gap-bridging. This strategy may act as a mechanism for differentiating between and prioritising the different ideas and communications encountered by individuals. It appears that participants in this research encountered a particular kind of gap – a situation where they perceived a need for evidence with which to influence others. This need arose as part of a chain of perceptions and understandings of the world, which also includes the understanding of evidence based practice as a way of working, and a realisation of a need to interact with other people and their ideas in a way that would enable the participants to exert some degree influence over other individuals. The gap that participants encounter exists between their recognition of a need to influence others and their ability to achieve this influence. Seeing and designing knowledge through a prism of evidence and evidence based practice provides an approach to constructing the metaphorical bridge required to get the participants across their gap. Rather than a ‘thing’ evidence then becomes a process – participants are evidence-ing in order to get from A to B in the situations they describe. Evidence could



therefore be placed as a form of knowledge use, or, to use the more traditional vocabulary of information behaviour, as a form of information use, rather than as a 'thing' or as an input into a process of information behaviour.

Discussions of the concept of 'evidence' in literature on information, knowledge and data is in itself fairly novel, as there seems to be little literature dealing with this area. A small number of research articles linking conceptualisations of information with conceptualisations of evidence were identified during background research and reading for this final chapter. These included a critical analysis of information behaviour in areas of uncertainty (Genuis, 2007), a model of collaborative information synthesis as a form of information behaviour engaged in by medical and public health scientists (Blake and Pratt, 2006), and several conceptual discussions of the roles of evidence and information from the field of archival science (Furner, 2004, Furner et al., 2002) (Yeo, 2007). Some of the descriptions of evidence found in this research present it as information used for a purpose: *"The key to conceptualizing, and, by implication, managing information as evidence lies in understanding the potential nature and use of individual or accumulated information objects for probative or interpretive purposes."* (Furner et al., 2002 p. 498). The study of information behaviour in uncertainty arrived at a similar conclusion, suggesting that *"In order to understand HIB [Health Information Behaviour] during uncertainty, it is necessary to view evidence not as something that is implemented but as something that is translated into practice through a highly contextual process that is facilitated formally and informally by individuals, information sources, and communication media."* (Genuis, 2007 p. 224). This study suggests that evidence should be viewed as constructed (Genuis, 2007), and its reference to evidence as something that is translated by individuals in context comes close to the ideas presented in the present research in its emphasis on the role of the individual as a kind of 'facilitator'. However, it still suggests evidence as a thing, fed into a process mediated by an individual. This thesis differs slightly in that it suggests that evidence be regarded as the process (evidence-ing) rather than the input. Archival conceptualisations of evidence have also

described it as a property of sources (which could include regarding physical documents themselves as evidence or the utterances or symbols which those physical documents contain as evidence) and as a property of ideas, which includes the meanings which we assign to content and sources (Furner, 2004). Archival researchers interested in conceptualising records and evidence have also noted that there are disagreements over *“the extent to which evidence has any meaning independent of human action or thought”* (Yeo, 2007 p. 324). *“[E]vidence . . . does not do anything actively. Human beings do things with it or to it.”* (Yeo, 2007 p. 324). *“Evidence . . . arises out of processes of social negotiation after the fact.”* (Yeo, 2007 p. 326). This demonstrates that the conceptualisation of evidence not as a ‘thing’ input into a process, but rather as a process or as a way of perceiving and conducting an interaction with knowledge does exist. However, this conceptualisation, which originates from disciplines other than library and information science, does not appear to have previously been applied to aid in our understanding of what public health practitioners do with the ideas and communications which they seek out in order to navigate their day to day tasks and situations - or at least not in studies which describe themselves as being about information behaviour.

#### **9.4 Individuals not as isolated actors but as participants in socially constructed ideas about interaction and communication**

Another point which the substantive theory developed during the thesis emphasises is the importance of social groups to understanding individual interaction and communication behaviour. Dervin’s sense-making methodology suggests that this may be important as *“People are helped by others who see the situation as they do, but also by those who see the situation differently”* (Foreman-Wernet, 2003 p. 7). However, the idea of the individual as part of a larger group of individuals, and the influence that awareness of membership of this larger group may have on individual interactions with information is another area that is not well represented in earlier models of information behaviour.

Wilson's model of 1981 shows an individual user experiencing a need for information and looking for something to satisfy that need. Other people are present in the model, but only as a potential source of information, or as the recipients of transfers of information: "*The model shows that part of the information seeking behaviour may involve other people through information exchange and that information perceived as useful may be passed to other people*" (Wilson, 1999 p. 251). There is some reference to the context of individuals in Wilson's models, however the focus appears to be on the affect of context on information seeking behaviours rather than use. Similarly, other people also feature in Ellis' information seeking model, but only as a potential source of information during the 'starting' stage of the activities described. The model includes the following descriptions "*A variety of means were employed by those interviewed to obtain information when they were starting on new topics, including the use of informal contacts [...]*" (Ellis, 1989p.179) and "*Many of those interviewed said that their first step in finding information on a new or relatively unfamiliar topic would be to seek out people who knew something about the area and ask them for references [...]* An advantage of this approach is that the contact typically provides evaluations of the quality or importance of the references provided" (Ellis, 1989p.180). Bates also comments on the importance of others and of social networks as sources of information in her integrated model of information seeking: "*In academic departments, scientific laboratories, as well as at conferences and over listservs, the typical participant in a discipline or work group continually runs into people who have a lot of common areas of knowledge, people who can suggest information or resources of use to the participant*" (Bates, 2002).

What these models do not highlight is the importance of social groups and socially constructed ideas for understanding the ways in which individuals perceive and use the ideas and communications of others once they have been found. The only pre-existing information behaviour theory to highlight the effect of an environment that includes social groups on information use seems to be the Information Use Environment (IUE) theory. Taylor's IUE theory (Taylor, 1991) emphasises the influence of context on individual

behaviour. IUEs consist of the groups of individuals (defined by educational backgrounds, professional roles, and work tasks) that inhabit an environment, the kinds of problems that these individuals experience (e.g. need to find clarity in an area of doubt) and the setting of the individuals (which includes domain of interest, structure and priorities of organisations within which individuals work, methods of information access and any organisational policies that may affect access to information) (Taylor, 1991) . The theory of information use developed based on the experiences of participants in the present research has some similarities to IUE theory, in that it takes account of the wider world within which individuals operate (represented by the idea of domain influence in IUE theory). However, the theory presented in chapter 8 of this thesis adds to IUE theory in that it makes specific suggestions of how the existence of agreed ways of interacting with and communicating messages and ideas which are shared across the domain of public health play out in individual interactions and communications. Impacts of these factors include the importance of socially constructed ways of interacting with people and ideas (evidence based practice) and concepts such as authority, relevance and authenticity as elements of the sense-making process that participants undertake with the ideas that they encounter. Knowledge of a broad shared structure of evidence based practice into which participants could fit their past experience and understanding of what would be more generally accepted as objective, authoritative or relevant information for any given situation allowed them to attempt to predict how others with whom they were to interact might perceive information. This may then allow scope to make adjustments to the sense-making journey and the way in which the outputs of that journey were communicated to others.

The sense-making process of public health worker participants which this thesis presents concentrates on influence as the main purpose for which this process is undertaken, and in doing so highlights some areas for refinement in the macro models of information behaviour proposed by Wilson (Wilson, 1981). Influence as a way of putting ideas to work does, in a sense, involve the transfer of those ideas. As such, it depicts a type of behaviour which may

be covered by the reference to information transfer found in Wilson's model (Wilson, 1981). However, the sense-making process described in chapter 8 makes it clear that ideas are not passed between individuals in a value-free manner. The understanding that ideas are used for influence, and the attention which has been given to understanding this concept makes it clear that certain ideas are being transferred because individuals have assigned particular properties or values to those ideas. The ability to assign such values to ideas is affected by factors similar to the intervening variables which in Wilson's later behaviour models are only seen affecting information seeking (Wilson, 1999) (Wilson, 1996). It is suggested that based on the findings of the present research, similar variables or factors go to make up the Knowledge-Experience Framework which, in the sense-making process described in chapter 8, impacts on sense-making and therefore on the outcome of that process, which is a decision as to whether the understanding developed from interacting with the ideas can help the individual to reach their desired goal. In a situation where an individual attempts to use their understanding of ideas on a public health issue to influence another person by sharing that understanding with them, they may make their best endeavour to communicate the idea in an unfiltered and unbiased way e.g. by simply passing on citation details of a relevant piece of research. However, like it or not, the individual has still affected this apparently straightforward process of transfer in the very fact of their choices about what to pass on to whom. Such decisions can be affected by the individuals' thoughts and ways of thinking about the world and the topic area of the report and the world in which colleagues work. They choose what to pass on because they have a certain view and understanding of the world and their function in it, and also of the usefulness and relevance of the content of any report.

The present research advances on previous literature on information behaviour in public health because, with the help of sense-making as a framework for understanding information use, it has been able to draw out some of the social and situational factors which shape individual interactions with ideas and communications. These social and situational factors

were represented not only by the prominence of evidence based practice, but also by the emergence of the concepts of credibility, authority and authenticity as elements of the process participants undertake when using knowledge for sense-making. Previous literature on information needs and seeking in public health has described a need for credible information, something which became an important theme in the findings described in chapters 7 and 8. There are several mentions of a need for authoritative, credible or expert information amongst this literature (for example Revere et al. (2007), LaPelle et al. (2006), Rambo (2000), Martin and Simpson (2005)). It has been reported that *“An information source’s accessibility, relevance, trustworthiness, currency, quality, and reliability can determine whether an information need is met or is not fulfilled.* (Revere et al., 2007 p. 417). However, prior to the present research the way in which ideas of credibility or authority are conceptualised with reference to public health knowledge or information does not seem to have been explored. Following up some of the studies which have been described as reporting a need for authoritative and expert information in reviews of public health information behaviour (Revere et al., 2007), during preparation of this final chapter, it transpired that some of the articles cited do not mention either concept (for example (Bravata et al., 2002), (Choi et al., 2004), (Baker et al., 1995) (Forslund and George, 2002) do not specifically mention authority or credibility). Articles thought to describe a need for authoritative, credible information tend to refer to the need for data (e.g. disease monitoring data) (for example (Bravata et al., 2002), (Choi et al., 2004), (Forslund and George, 2002)) or contain references to research such as systematic reviews (Revere et al., 2007). Possibly therefore, the idea of credible and authoritative information has been equated with data and scientific research. These research papers also tend to describe public health workers as ‘decision makers’ so perhaps for authoritative information, we should read ‘information on which decisions can be based’. However, the connection between properties of knowledge and concepts of authority should be articulated. In previous research, because these concepts have not been clarified, there seems to have been an assumption that it is already clear what authority and credibility mean for public health. Taking the time to thoroughly

explore these concepts, which are clearly important to understanding sense-making in the participants in the present research further underlines the importance of social and situational dimensions of sense-making in public health. One result of this has been to describe the concept of authority as it may appear in relation to some of the different forms of information that participants encounter e.g. subjective forms such as expert testimony/opinion as well as more objective scientific information or data. Differences in perception of authority between different individuals have also been highlighted and linked back to individual frames of knowledge and experience. It appears that authority is dependent on situations and social dimensions. There is likely to be some agreement between members of the same domain, but this is not universal. Therefore assumptions of what public health workers consider to be 'authoritative' in any given situation or setting could and perhaps should continue to be articulated in more detail in further research on this topic, to ensure that deeper understandings of how public health workers interact with information continue to develop.

## **9.5 Reflections on the methodology and limitations of this research**

This thesis set out to develop a model of information use in public health and has concluded with the presentation of a substantive theory of information use which describes the construction and communication of evidence within an evidence based practice context. A broad conceptualisation of information use was employed, and this was drawn from Dervin's sense-making methodology. Semi-structured interviews and vignettes were used to gather data, with Grounded Theory techniques used to analyse data and develop the substantive theory.

The use of semi-structured interviews and vignettes to capture information use was not without problems. The micro-moment timeline interview (MMTI) technique included in Dervin's sense making methodology was in itself challenging to implement. Dervin has stated that interviews using this technique are often lengthy, e.g. up to 2 hours. It was felt that it would not be practical to attempt 2 hour interviews with participants who are busy

professionals. As a result, an abbreviated form of the MMTI was used. This generally worked well, allowing time for both interviews and vignettes, although in one case it was not possible to conduct the vignette in addition to the interview, due to lack of time on the participant's part. Despite this minor difficulty, interviews still generated enough data to allow theory development, and in fact each interview lasted approximately 45 minutes. However, the fact remains that longer interviews would have allowed a fuller application of the MMTI technique, and may have generated additional insights.

This investigation used a holistic conceptualisation of information use which included cognitive and therefore unseen uses, and set no limits on how 'information' could be defined. In some ways, this worked well, as this conceptualisation in combination with the interview approach suggested by sense-making meant that participants could be invited to define their own situations and tasks to talk about, and it is hoped that this had the effect of allowing them to describe their experiences in their own terms. It did however have a side effect of presenting some challenges for data analysis. Grounded Theory techniques suggest that detailed line by line coding be conducted in early stages of data analysis (Urquhart, 2013). A broad research question or topic can be used as a frame to direct attention to relevant areas of data to code during analysis. However, having a broad conceptualisation of information use, meant that at times it was difficult to pin down what was and was not relevant, particularly early on in the analysis. The use of a broad conceptualisation of information use in combination with detailed open coding as suggested by Grounded Theory was partly why such a large number of open codes (over 100) was initially generated. There were further challenges related to the use of Grounded Theory in the coding stages of the research. Although the Grounded Theory approach used in this research leans more towards the Straussian school, Glaserian coding approaches have been used in that the coding is broken down into stages of open, selective and theoretical. This approach was taken due to the difficulty in applying some coding approaches that have been suggested by Strauss, specifically the matrix of causes and conditions, and coding paradigms that have been



suggested in some writings by Strauss, specifically in earlier editions of the book 'Basics of Qualitative Research' (Urquhart, 2013, Corbin and Strauss, 2008). In recognition of the fact that Strauss dropped the reference to coding paradigms in later editions of the key text for Straussian Grounded Theory, instead emphasising the use of a broader set of tools for coding (Corbin and Strauss, 2008, Urquhart, 2013), a decision was taken to work with the Glaserian approach to coding, which proved much more manageable. Some Grounded Theorists may see this as a problem with this thesis, citing a paradigmatic conflict between the use of an interpretive paradigm and semi-structured interviews and the Glaserian approach to Grounded Theory which is often seen as more positivist and objective (Howard-Payne, 2016, Rieger, 2019). However, convincing arguments have been presented elsewhere, making the case that Grounded Theory is in fact paradigm neutral rather than being positivist (Urquhart and Fernández, 2013).

The participant group on which this theory is based is small, consisting of fourteen participants. While theoretical saturation was reached, and this is demonstrated by the ability to construct a substantive theory from the data gathered, nevertheless the small sample indicates that the theory developed may not be representative of the public workforce as a whole. Another limitation exists in the constitution of this sample, and the way in which it was developed. Beginning with a convenience sample, snowballing was used to expand this sample. Although this was successful in identifying further participants, snowballing has likely resulted in a group of participants who are all part of the same network and may therefore possess the same or similar characteristics. This may have limited the variability of the sample, again indicating that the substantive theory developed here may not be applicable across public health workers. There is an issue around the breadth of public health roles represented within the sample. The public health workforce is notoriously difficult to define, and the classifications used in chapters 5 and 6 of this research are drawn from a 2014 report from the Centre for Workforce Intelligence (CfWI) (Centre for Workforce Intelligence, 2014). Individual participants all worked in roles where they dealt with public

health topics on a day to day basis, with several working for non-profit organisations, and others from research and academic institutions. Some participants were involved in public health relevant work for more than one organisation. The non-profit public health roles undertaken by most of the participants seem to best fit within the CfWI category of public health specialist, which includes those working in advocacy and research in third sector organisations. There are many public health roles defined by the CfWI that are not represented in the sample population used here, including public health practitioners, public health inspectors and Local Authority public health workers. Further research with a greater focus on gathering data from these missing groups could be used to test the applicability of the substantive theory presented in this research.

## **9.6 Conclusion**

This thesis addressed three research questions on the situations, gaps and barriers experienced by participants during sense-making. A final reflection on how these questions have been answered through the development of the substantive theory of sense-making proposed in chapter 8 is presented below. Following this, the thesis will conclude with some final reflections on the implications of the substantive theory proposed here for information behaviour workers, public health practitioners and information professionals supporting those practitioners and related groups.

The three research questions addressed by this thesis were: 'What situations and gaps in understanding do public health workers experience in their day to day work?'; 'How do public health workers use information to make sense of their situations and progress in their work?', and 'What barriers do public health workers experience in trying to make sense of the situations they face in the workplace?'. Final reflections on how these questions may be answered are presented below.

On the situations and gaps in understanding experienced by public health workers day to day, there are specific answers, and there is also a broader conceptual answer. In specific terms, the answer to this question is that even within a relatively small number of participants, a wide variety of situations and tasks exist. Participants look for facts and figures in order to feed them into the development of recommendations. They analyse and present data on public health problems to try and capture the attention of governments and decision makers. They write journal articles, handle student marking and have to liaise with local and national health care providers and organisations. The conceptual answer to this question is that participants find themselves in situations where they need to influence other people, and need to construct evidence to do so. The participants in this thesis experienced their situations as situations where they need evidence in order to have some hopes of influence over other people. There are two parts to this situation. Firstly, participants must do some intellectual work to construct an evidence relationship between an idea and an outcome or an event in the real world. Secondly, they must communicate that evidence to the persons that they want to influence – the interview data showed that a series of strategies are used to do this. This need can exist at various levels and it is not only limited to attempts to influence politicians and policy makers as direct colleagues can also be involved. Sense-making suggests that people experience gaps in understanding and these gaps in the present thesis are in effect the gap between an awareness of a need to influence another person in the content of EBP and the knowledge of what will be the most effective communication of an idea to achieve that influence. These situations can sometimes involve conflict. Participants see themselves as members of a professional group and have an understanding that this professional group is expected to work in a certain way i.e. by going through the process of creating and communicating evidence. As participants perceive themselves as being part of a group, they think about the perceptions and opinions of other people in that group, perhaps especially those that will receive or scrutinise and question their communications.

In answer to the question on the way in which participants use information to make sense, and progress in their work, it has been demonstrated that the participants use ideas from new information in combination with their pre-existing knowledge and experience in a process of creating evidence. This is a complex process, and it involves participants applying not only their own subject knowledge, but also their experiences of interacting and communicating with other people involved in public health, and their understanding of how 'evidence' is viewed by the community in general. There is some evidence to suggest that they consider the importance of two opposing world views – an objective/rational world view and an emotive/subjective world view. They consider this in light of the kind of public health question that they are dealing with (which view will best enable them to answer that question) and in light of the individual that they are trying to influence (which view will be most likely to influence that person). This boils down to the participant asking themselves – what is the best kind of information to answer this particular question, and what is going to be most likely to influence the person that I will communicate with?

The process of creating evidence is evaluative and is also geared towards a future communication of that evidence. As an evaluative process, the participants think about the authority and credibility of information, particularly where they are dealing with information that is scientific or objective. Where they are dealing with information that is more subjective, e.g. individual views on public health interventions or issues, they value relevance and authenticity. Participants' awareness of themselves as part of a larger social group, and their end goal of communicating the evidence that they create to other people whom they want to influence also means that during their creation of evidence, they use the concepts of authority and relevance to understand the influencing potential of that evidence. This is enabled by the fact that authority is partly socially conferred – it has been suggested that while individuals make authority decisions, those decisions are influenced by prevailing

views on what is authoritative within a particular field - authoritative knowledge has been defined as that which is considered legitimate within a community (McKenzie, 2003).

The bigger question which this thesis asks, which is a question that unites the 3 research questions is, how do public health workers carry out sense-making? The process is an answer to this, though perhaps not the only answer – further research may be able to demonstrate the existence of other processes of sense-making in public health.

As this thesis reaches its conclusion, turning to the final research question, on the barriers encountered by participants, one reflection which is worth highlighting is the possibility that discussion of barriers in the sense-making of public health workers may be an over-simplification. What this process describes as a sense-making journey is a process of planning, developing and delivering a communication. It is a representation of the way in which context defines the process of creating evidence and communicating it, and the way in which context is shaping the role that ideas have in that communication. Because this process is all about communication of ideas and knowledge, it is also about other people, and the participants' interactions with them. There are two key factors which determine and shape the sense-making process - the context of EBP, and the fact that this context, by definition, involves communication of ideas with other people. These two factors of context and other people could both at times constitute 'barriers' in the participants' sense-making journey. However, they may not necessarily prevent communication, but may instead alter its course or shape – therefore the word 'barrier' appears less appropriate. It may instead be more insightful to ask how those factors of other people and the context of EBP shape participants' sense-making and actions in their situations. One answer is that participants can experience difficulties when their own ideas about what constitutes 'good' evidence in a particular situation are not matched by those of the people they are attempting to influence, or those of other groups of people who may observe participants communications and also be engaged in their own attempts to influence decision makers. If other individuals who engage with participants communications have different ideas about what constitutes

'evidence' this can affect the chances of success of the participants attempts to influence people. It also appears, based on the interview data, that the very context of EBP can act as a barrier. Some of the participants indicated that the need to be evidence based could in fact be a barrier, in situations where there was little or no evidence available to support a communication. This is linked to, and perhaps part of the barrier which can occur when individuals have different perceptions of what constitutes good evidence. Some of the participants described situations where, because a certain type of evidence, a type that was 'preferred' by some people was not available to support a communication, they had had difficulty in influencing people in relation to that communication. Because a discrepancy or a disagreement as to what would be acceptable as evidence had occurred, this was problematic for participants. This is essentially linked to the tension between objective and subjective forms of information which is explained in chapters 7 and 8. In effect, it appears that some participants encounter individuals who tend to place more emphasis on the importance of objective evidence, and at times this can result in their excluding or discounting evidence from more subjective sources from being a credible justification or rationale in an argument. This in effect erects a barrier to participants attempt to influence when using ideas from this kind of evidence.

The majority of this final chapter has been devoted to comparing the sense-making process which is the main output of this thesis to pre-existing models of information behaviour. In carrying out this comparison, it has become clear that the sense-making process presented here is not a model of information behaviour, and should not be taken as such. This is because, as this chapter indicates, the most well known and field defining models of information behaviour have been carried out to inform the development of information systems, and as such may be more about how people behave when interacting with those systems. The model proposed here is about how people behave when interacting with other people and the ideas and communications they make, and how they behave in communicating those ideas onwards to other people.

In addition to the systems focus of information behaviour model, these models also often represent information as a thing with a life of its own. Use of the term information is equated with a separate entity. For this reason, the terms information behaviour and information use are not the best fit for the process developed during this thesis. This process could more appropriately be termed a process of interaction and communication between people and ideas. This thesis has attempted to shine a spotlight on these interactions and the way in which they are shaped by shared understandings of elements such as evidence based practice, instead of focusing on what people do with information entities. This thesis was intended to be a sense-making study, and it has therefore presented a representation of the way in which the research participants understand their situations and the ideas and expectations of their peers and interacted with those ideas in order to arrive at new understandings of specific situations. This representation is a process of the way in which individuals communicate with each other to reach understandings of their world, rather than a traditional model of information behaviour.

The alternative view highlighted by this thesis provides an opportunity for public health practitioners and policy makers to free themselves from debates around the robustness and appropriateness of types of research and re-focus their thinking on the way in which public health as a community constructs evidence. The substantive theory presented in this thesis suggests that the concepts authority, relevance and authenticity play an important part in individual constructions of evidence. This is not to say that all considerations about the robustness and relevance of information to specific public health questions should be abandoned. However, it is suggested that a greater appreciation of the importance of authority, relevance and authenticity in the construction of public health evidence may help to support practitioners' communications and interactions. Effort could be directed at increasing understanding of how these concepts are defined in public health, and guiding practitioners to consciously consider these elements, rather than focusing on solely on typologies of evidence as has previously been the case. As authority in particular is thought

to be partly socially constructed (McKenzie, 2003), and relevance in the context of EBP clearly necessitates an understanding of relevance to recipients of communications, a greater understanding of the role of these concepts in the construction of evidence may aid the successful communication of that evidence. It appears that similar alternative perspectives on evidence in public health may have begun to be recognised in recent years, as a small number of articles and discussion papers can be found which refer to evidence as dynamic rather than static, and appear to allude to evidence as something which is constructed, or at least appear to acknowledge the role of individuals and their mental states in the development of knowledge (see Sedig et al. (2015) and Birko et al. (2015) for examples).

For information behaviour researchers, several avenues of further investigation are suggested. Further research into the way in which evidence is constructed in public health could be carried out, using sense-making methods as a basis. It was noted in limitations of this work that some areas of the public health workforce were not sampled in this thesis, and so these groups could be a focus for further research. In addition, there could be moves to determine whether the substantive model developed in this thesis could become established as a formal theory. This could only take place through research into the sense-making process and construction of evidence in other disciplines that claim to be evidence based, and the comparison of findings with that of the present research. Information behaviour researchers could also seek to further explore some of the key concepts which feature in the substantive theory proposed here: authority, relevance and authenticity. Qualitative research with public health practitioners and other groups could determine how individuals make judgments about authority, relevance and authenticity during the act of sense-making and evidence construction, rather than in the context of information seeking and systems within which these concepts are often seen. It is suggested that authority and relevance are socially determined in the sense-making process presented in this thesis. Data on how individuals understand these concepts during the act of creating evidence would be of



interest in verifying and better understanding the importance of the social and communicative aspects of evidence construction.

The findings of further information behaviour research as suggested above could be made use of by information professionals supporting public health practitioners and related sectors. This data may indicate revisions and expansions of the kind of information literacy education that information professionals typically provide to these groups currently. It is suggested that information professionals should recognise evidence as something that is constructed by individuals to meet the demands of a specific time and place, rather than seeing it as an immutable object which can be transferred unchanged from person to person. In adopting this recognition, the profession will gain the ability to pass this conceptualisation on to those whom they aim to support with instruction on information literacy education. In practical terms, this recognition might take the shape of an expansion of IL frameworks to include clear conceptualisations of information systems and objects, the knowledge and ideas contained within those, and evidence as construct, or relationship between an idea and an outcome, rather than as a type of information, or a series of things. There may also be a role within information literacy education for library and information professionals to educate and support their users in articulating and communicating the processes by which they construct evidence. Such communications might aid transparency around evidence and understanding of how decisions are made as a result of evidence – something which, at the time of writing is a particularly prominent issue as a result of the Covid-19 pandemic.

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## **Appendix 1: Original research proposal (drafted prior to start of PhD)**

**Provisional title: Profiling the information behaviour of the third sector public health workforce**

**Purpose of research:** To develop a model of the information behaviour of the third sector public health workforce, including information literacy skills and ability and competences.

Information behaviour has been defined as “those activities a person may engage in when identifying their own needs for information, searching for information in any way, and using or transferring that information” (Wilson, 1999). Previous attempts at information behaviour research have been criticised for using quantitative techniques to model human behaviour and for not establish the difficulties and barriers which may inhibit individuals’ attempts to access information (Wilson, 1999).

While there have been numerous studies into the information needs and behaviour of the clinical health workforce, there has been little research in the UK into the information behaviour of the public health workforce, in particular those working in policy driven environments such as the third sector. These groups are more likely to experience difficulty in accessing information than public health workers in an academic or health service setting, because they tend to lack sources such as journal and database subscriptions due to financial constraints. The third sector public health workforce also represents an interesting study group because they are often likely to be required to cover a wide range of topics in their work roles.

In addition many professionally-aimed health information resources including commercial databases such as PubMed, Evidence Search, although covering some public health topics are clinically focussed in terms of the taxonomies they use to organise information and the types of information that they index. Previous research has shown that there is a need for greater resource provision for to meet public health information needs.

The results of the proposed research will provide a model of information behaviour in the public health third sector workforce which can be used to better understand this group. This knowledge can be used to support the creation of new resources and services which will be more suited to their needs.

### **Research questions:**

1. What are the characteristic traits of information behaviour of third sector public health workers?
2. What factors affect and inhibit this group when they attempt to access and use information?
3. In what ways (if at all) do these individuals participate in information exchange? Do they use face to face or electronic methods of communication?

## **Methodology**

### **Data collection**

Data will be collected through a mixed quantitative and qualitative survey, supplemented by interviews with selected subjects. The qualitative approach will be taken in light of past research, which has highlighted the need for qualitative research techniques appropriate to the study of human behaviour to be used in the study of information behaviour. Although the study aims to create a model of information behaviour of the public health workforce in the third sector, data will also be collected from other groups within the public health workforce in order to create a comparison or control group, which will be useful in determining any differences between the behaviour of the third sector workforce and others.

Areas of particular interest in the proposed research are:

- Information skills of third sector public health workforce – search, retrieval skills and ethical use of information

- Barriers to information access experienced by the workforce
- Behaviour when confronted with barriers – how individuals attempt to obtain information that is not readily available
- Type and form of information used by the workforce

## **Analysis**

Quantitative data will be analysed using Excel and SPSS. Statistical techniques such as t tests or chi square tests may be used to compare results of the survey from different work groups. The final selection of statistical test will depend on the characteristics of the data gathered (i.e. parametric vs. non-parametric data), however it is likely that Chi Square or other non-parametric tests will be used as the quantitative data gathered will be largely categorical in nature. These kinds of tests can be useful in determining whether there are different patterns of response displayed between different groups in a dataset, and could be used to compare responses from third sector public health workers with those of other groups. The results of these kinds of tests can not given any indication of cause of any differences found between groups, but can be used to highlight areas for further investigation. The quantitative data gathered can then be used to infer possible causes for any apparent differences in responses which may indicate different behaviour patterns between groups. A technique such as Grounded Theory or Interpretive Phenomenological Analysis will be employed to code and analyse qualitative data. These techniques are commonly used to analyse data gathered in sociological or psychological studies and as such are appropriate to the understanding of behaviour patterns. Grounded Theory in particular is a suitable technique for the proposed research as it incorporates an understanding of the wider context (situational, societal etc.) in which behaviour takes place. The proposed research will be investigating the behaviour of groups of individuals working in different environments, with differing access to resources and therefore a qualitative analysis



technique (such as Grounded Theory) which takes into account the wider environment is highly appropriate.

### **Possible limitations**

The qualitative and quantitative data gathered in this study will be self reported data. This form of data is always vulnerable to response bias. Responses given in relation to the information skills, search and retrieval and use practices of individuals may also be affected by these individuals' estimates of their own skills competence. Competency theory states that a highly skilled individual may underestimate their own skill level, while low skilled individuals are likely to over-rate their skills. Therefore obtaining accurate data purely from self reports will always be challenging.

Possible methods that could be employed in the present study, to reduce response bias include adding objective questions to the survey. These questions would be designed to provide a measure of the respondents' knowledge on common practices in searching for information (such as use of Boolean logic) or their understanding of copyright and open access practices and how these practices affect what is permissible in terms of ethical use of information.

Further methods to reduce bias could also include carrying out monitored information retrieval sessions, where subjects invited to participate could be given an information retrieval task to complete under observation. This observation data could then provide valuable insight into participants' information skills.

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**Appendix 2: Table showing count of occurrence of open codes overall and per participant**

Open code	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	P11	P12	P13	P14	Total
Checking a specific source	9	4	5	0	3	0	0	0	0	0	0	0	0	1	22
Constructing options for moving forward	0	0	0	1	9	0	5	0	0	0	0	0	0	0	15
Decision making	1	1	2	0	6	0	1	5	0	1	2	1	6	0	26
Effects of narrow perceptions of evidence	0	0	0	0	0	0	0	1	0	0	2	0	1	0	4
Evaluating information	7	2	9	5	5	11	3	4	2	0	6	9	3	10	76
Evidence is a mixture of things	0	0	0	0	0	2	0	1	0	0	1	0	6	0	10
Expert information and witness	3	0	0	6	2	3	1	1	3	4	0	0	7	0	30
Facts and truth	18	15	11	0	8	3	4	2	4	2	9	1	9	10	96
Framing an issue	1	0	7	7	1	0	0	0	0	0	0	0	1	0	17
Good quality grey lit is more relevant	0	0	0	0	0	4	0	2	0	0	0	0	1	0	7

<b>How do we make sure everyone is on the same page</b>	0	0	0	2	0	3	4	2	0	1	0	0	1	0	<b>13</b>
<b>I need into to be presented in a way that's useful to me</b>	0	4	7	3	0	9	0	0	0	0	1	0	1	1	<b>26</b>
<b>In order to get some headlines</b>	3	0	0	0	0	0	0	1	0	0	0	4	0	5	<b>13</b>
<b>It's good to have the authority</b>	12	3	5	3	2	6	4	8	1	0	5	0	0	9	<b>58</b>
<b>Justification</b>	0	5	4	0	2	0	1	0	0	0	0	1	1	1	<b>15</b>
<b>Looking for consequences</b>	8	1	3	1	12	5	1	2	1	2	5	1	10	7	<b>59</b>
<b>Need to be evidence based can be a barrier</b>	0	0	0	0	1	0	2	0	0	3	0	1	1	0	<b>8</b>
<b>People want to reject evidence when it cuts against their views</b>	0	0	0	1	6	1	3	2	1	2	1	3	0	2	<b>22</b>
<b>Public health and public health research are not the same</b>	0	0	3	2	4	5	5	22	1	0	4	6	6	1	<b>59</b>

<b>Quantitative evidence is better than qualitative</b>	0	0	0	0	0	0	0	0	1	0	4	3	0	0	<b>8</b>
<b>RCTs are often not the answer</b>	0	0	0	0	0	2	1	0	0	0	5	0	1	0	<b>9</b>
<b>Understanding local context is important evidence</b>	0	0	0	0	0	1	0	6	0	0	0	4	2	0	<b>13</b>
<b>Verifying and cross checking information</b>	0	6	0	0	0	0	0	0	0	0	3	0	0	0	<b>9</b>
<b>We weren't going to have all the answers</b>	19	2	8	3	5	2	3	4	0	0	5	3	1	3	<b>58</b>
<b>You have to have an audit trail of evidence</b>	8	19	11	1	6	4	2	3	0	4	3	2	11	7	<b>81</b>
<b>You're trying to build a case</b>	7	2	5	11	0	10	4	6	1	3	4	5	9	6	<b>73</b>

### Appendix 3: Count of occurrence of selective codes in total and per participant

Participant number	Personal experience, knowledge & perception of information	Experience of external perceptions of information	Paths to influence	Evaluation and integration of information	Influence
1	17	7	5	11	10
2	2	2	8	2	2
3	11	7	4	6	5
4	7	3	8	4	11
5	8	1	6	5	6
6	9	6	8	6	10
7	8	3	8	6	6
8	8	11	4	5	9
9	5	3	1	3	1
10	6	1	9	4	5
11	14	10	5	12	7
12	10	4	5	6	4
13	10	8	11	7	10
14	9	0	4	12	5
<b>Total number of quotations</b>	<b>124</b>	<b>66</b>	<b>86</b>	<b>89</b>	<b>91</b>

**Appendix 4: Table showing count of occurrence of theoretical codes in total and per participant**

<b>Participant number</b>	<b>Evidence Based Practice</b>	<b>Perception influences integration of info into sense</b>	<b>Evaluation develops potential to influence</b>	<b>Influence is attempted through sense making</b>
<b>1</b>	11	11	9	6
<b>2</b>	9	2	5	2
<b>3</b>	12	2	1	3
<b>4</b>	15	2	6	7
<b>5</b>	4	7	3	5
<b>6</b>	15	6	5	3
<b>7</b>	10	5	5	3
<b>8</b>	8	5	1	2
<b>9</b>	6	4	0	0
<b>10</b>	5	4	0	3
<b>11</b>	16	10	2	1
<b>12</b>	7	1	1	3
<b>13</b>	17	0	6	8
<b>14</b>	5	8	1	4
<b>Total number of quotations</b>	<b>140</b>	<b>67</b>	<b>45</b>	<b>50</b>

## Appendix 5: Interview guide: Sense-making study of information use in public health

### Section one: Situation

*Focus on asking participant to describe the current situation. The aim is to get an understanding of their reality and experiences – what is happening to them and what are they trying to do.*

**Please describe a situation you have recently faced at work that related to improving public health and where you were struggling to achieve what you wanted to do.**

**Please explain how this situation has come about, and what happened during it.**

**Name:**

**Date:**

Step/Event	Details

### Section two: Gaps

*Focus on analysing what is happening to the respondent in their situation – choose or ask*



*them to choose one particular part of the situation describe previously to elaborate on. Find out what is the 'gap' or information need that they are experiencing – what questions are they asking.*

### **Questions that arose**

#### Prompts

- Was/Is there something particular that you need to know/find out before you can move forward?

### **Answers found**

#### Prompts

- Were answers found? What were they?
- What was the answer, if you got one?
- Has this answer led to any more questions?
- If you don't have an answer yet, do you have any ideas/thoughts on how you might find that out/find an answer to your question?

### **Section three: Uses**

*Focus on finding out about the uses of the answers to their questions (the information). Dervin's identified uses can be used to assist coding of answers.*

**If you have been able to get an answer, how do you think that answer has helped or hindered you in your task?**

**Was there anything that prevented you from getting an answer to your questions or made getting an answer more difficult for you?**

## Appendix 6: Think aloud exercise protocol: Sense-making study of information use in public health

### Introduction from researcher

*“I am interested in understanding the processes of how you use information, and how it can help you, or raise more problems or issues for you in your work. I want to ask you to read a document chosen from the selection on the table in front of you, and comment out loud on what thoughts occur to you when you read this document.*

*There is no right or wrong response in this test, and I am more interested in understanding the general processes behind how you internalise the information, and how it fits with what you already know than I am in what you think about the specific piece of information that you read”*

*At any point where something occurs to you when reading the document, that you would like to verbalise while reading the document, please stop and say this out loud so that I can follow your thinking.*

*At the end of the exercise I may ask you a few additional questions based on your comments, in order to clarify what you mean”.*

**Note:** if participant is unsure about the task, carry out a practice example, where the researcher reads and comments before asking the participant to carry out the task.

- Selection of short documents/summaries (1-2 pages) on various public health topics are provided as print outs.
- Participant can choose whichever document most appeals to them in order to carry out the exercise.

**Name of participant:**

**Document chosen:**

**Date of session:**

<b>Comment from participant</b>	<b>Notes/questions</b>	<b>Clarification</b>

## Appendix 7: Information Sheet for participants in interviews

**You will be given a copy of this information sheet.**

**Title of Project:** Information use in public health: A sense-making study

This study has been approved by the UCL Research Ethics Committee (Project ID Number):

6371/001

**Name:** Jennifer Ford

**Work Address:** UK Health Forum, Fleetbank House, 2-6 Salisbury Square, London EC4Y

8JX

**Contact details:** Email: [ucyljef@live.ucl.ac.uk](mailto:ucyljef@live.ucl.ac.uk) or [Jennifer.ford@ukhealthforum.org.uk](mailto:Jennifer.ford@ukhealthforum.org.uk) or

phone: **020 7832 6920**

We would like to invite [name of participant]  
research project.

to participate in this

### Details of Study

#### What is the purpose of this study?

The aim of this research is to understand how public health workers in the UK use information. I would like to ask you what kind of situations arise in your work where you need new information to move forward, what kind of questions you face and how information helps or hinders you. Interviews will also include an activity where you will be asked to choose a document from a selection on different public health topics, read it, and comment aloud on what thoughts and questions it raises for you.

#### Who is participating in this study?

Anyone who is currently working full or part time in a public health role based in the UK can take part. At the end of the interview you will be invited to suggest any colleagues that you think might be interested in taking part.

### **What will happen if you agree to take part in this study?**

If you agree to take part, I will contact you to arrange a time to meet for an interview. With your permission I will record the interview, which will not take longer than 2 hours. After the interview, I will write up a summary of our discussion (either from the recording if you have agreed to it, or from hand written notes taken by me). I will send this summary to you and ask you to check it and make any changes or additions to it if you wish. I will use your answers to my questions, together with notes from other interviews to work out how information is used in public health work. This study is being carried out as part of my PhD research project. If you agree to take part, the data you provide will be analysed and reported as part of the write up of this research, and may also be reported in published form (e.g. in a journal paper). Please note, you can stop the interview at any point. If you do so, there will not be any penalty to you. Withdrawal from this interview will not affect your participation in any subsequent parts of the study, or your rights in regard to data protection and confidentiality.

### **What are the benefits to you of taking part?**

The interview provides you with an opportunity to reflect on and discuss with another person the kinds of problems you face in your work, and you may find this interesting.

### **Anonymity and confidentiality**

I will not name individual participants in this study when drawing conclusions from the information I collect. Participants will be anonymised and described broadly, e.g. 'Interviewee 1, a charity employee'. However, you can choose to have your comments and opinions attributed to you by name – this option is available on the consent form. I would also like to thank you for your participation in all public presentations of work based on these interviews. You will be asked if you would prefer to be thanked anonymously or by name. If you choose for your identity to remain confidential, please be aware that while every effort

will be made to protect your identity there is a risk that anonymous comments made by you could give away your identity.

### **Data protection**

This project has been approved by the UCL Research Ethics Committee and registered with the UCL Data Protection Officer. Data will be collected and stored in accordance with the Data Protection Act 1998.

### **If I am interested what do I do next?**

If you would like to take part, please contact me using the details provided. We will need to discuss your involvement in more detail and complete the attached consent form before proceeding. Please discuss the information above with others if you wish or ask me if there is anything that is not clear, or you would like more information. It is up to you to decide whether to take part or not; choosing not to take part will not disadvantage you in any way. If you do decide to take part you are still free to withdraw at any time and without giving a reason.

**Thank you for reading this information sheet and for considering taking part in this research.**

## **Informed consent form for participants in interviews**

**Please complete this form after you have read the Information Sheet and/or listened to an explanation about the research.**

**Title of Project:** Information use in public health: A sense-making study

This study has been approved by the UCL Research Ethics Committee (Project ID Number):  
6371/001

Thank you for your interest in taking part in this research. Before you agree to take part, the person organising the research must explain the project to you. If you have any questions arising from the Information Sheet or explanation already given to you, please ask me before

you to decide whether to join in. You will be given a copy of this Consent Form to keep and refer to at any time.

### **Participant's Statement**

I (please print name)

have read and understood the Information Sheet related to this study, and have decided to take part. The researcher has offered me a number of options for the way in which I participate in this study, and I would like to register the following choices with regard to my participation (**delete as appropriate**):

- I am/am not willing for my interview with the researcher to be recorded.
- Assuming that I have given my permission for my interview to be recorded, I would/would not like to receive a copy of that recording.
- I do/do not wish to receive copies of all public presentations of this work.
- I would/would not like my comments to be attributed to me by name in public presentations of this work.
- I would/would not like to be thanked by name for my participation in this study in all public presentations of this work.
- I would/would not be willing for access to any notes or recordings created from my interview to be widened after the completion of this study for the benefit of future researchers.
- Assuming that I am willing for access to the data pertaining to me to be widened after the completion of the study, I wish/do not wish that the data be fully anonymised at that stage.
- I understand that the information I have submitted will be published as part of a doctoral thesis, and may also be included in journal publications.
- I understand that such information will be treated as strictly confidential and handled in accordance with the provisions of the Data Protection Act 1998.
- I agree that the research project named above has been explained to me to my satisfaction and I agree to take part in this study.
- I wish to register the following additional conditions in relation to my participation (complete box as required):

The position set out in this document can be renegotiated during the course of your participation. Please keep a copy of it for your records and contact me if you wish to revisit it during the research process.

Jennifer Ford, Information Manager, UK Health Forum, Fleetbank House, 2-6 Salisbury Square, London EC4Y 8JX

Email: [ucyljef@ucl.ac.uk](mailto:ucyljef@ucl.ac.uk) or [jennifer.ford@ukhealthforum.org.uk](mailto:jennifer.ford@ukhealthforum.org.uk)

Signed:

Date:



## Appendix 8: Code book for open codes: May 2019

\*Evidence/Evidence Based Practice and Influence are included in the code book because they entered the analysis as open codes during the first round of coding. However, they were moved to different positions in the hierarchy of codes developed during later stages of the analysis. 'Influence' became a selective code, acting as a parent category for a number of the other open codes. 'Evidence' developed into 'Evidence Based Practice', which became a theoretical code. The descriptions of 'Influence' and 'Evidence/Evidence Based Practice' given in the chapters of the thesis which present the results and analysis of this research reflect the final positions of these codes in the model of behaviour which was developed – as such they are not described as open codes within these chapters.

Open code	Definition	Relevant participants	Example interview quotations
Checking a specific source	Used where participants describe going to a specific defined source for information. This code is about the process of each participant using their personal experience or knowledge in the process of deciding what information will be the best source to consult. This information might consist of an organisational source to be searched for online, or it might consist of making a judgement about which colleagues or other individuals known to the participant may be useful to consult. It might also consist of knowing what type of publication and	P1, P2, P3, P5, P14	<i>"So I haven't got the answers, my next step is another strategy for trying to get information, which is that I spoke to [...] who is the head of policy for [...], so that next time she goes along to the [...], it's a question she can ask and I think that's probably the route that I want to pursue since I haven't yet managed to find an authoritative view, which is to keep on asking the prompting questions. I also asked [...] from [...] who had no particular evidence either way." (P1)</i>

	<p>produced by who, will be worth waiting for as a source of further information.</p>		<p><i>"So it was [...] meetings, the [...] mechanism, guidelines, [...] guidelines around [...], which are quite old at this point, and off the top of my head I can't remember what the other two were. And then I also sort of left an open category for anything else that I happened to come across that I could attribute to, or that [...] would have been involved in, without defining it, so I kind of organised it like that."</i> (P2)</p>
<p>Constructing options for moving forward</p>	<p>Describes the ability to recognise possibilities, and related to the idea of predicting consequences of a decision, but not quite the same, because it's not necessarily just about what we will happen if an action is taken. It can also be about understanding the possibilities for how to go about something as well as what the potential outcomes might be. There is also a learning element to this understanding of options and possibilities - learning what could happen, what has happened to other people and thinking about</p>	<p>P4, P5, P7</p>	<p><i>"Yes, but maybe it sort of also made us feel more ok about our decision, because we might have felt, a lot worse, had it have been that they had had to re-do their whole masters, or had to redo all their exams again. Um, so maybe it was also about softening it for us."</i> (P5)</p> <p><i>"Absolutely, it's helpful that you've picked up the learnings because they're approaching things very differently to us, and they were more, they were further along than we were, so it was very helpful to speak to the head of the unit to learn from their</i></p>

	how to apply that to your own situation as possible outcomes.		<i>mistakes or learn what went well for them so that we could apply it in our sector." (P7)</i>
Decision making	<p>There is a strong element in the interview about using information in decision making. The term decision appeared fairly often in interviews, but not every quotation coded here actually included this word. In effect anything which seemed to describe actively making a choice, or deliberately completing an action was seen as related to decision making. Whenever you deliberately do something, as suggested by the use of 'action' you surely must be deciding to do that. So decision can be defined as a deliberate, intentional completion of an act or actions.</p>	P1, P2, P3, P5, P7, P8, P10, P11, P12, P13	<p><i>"[...] helpful in that it... it will...support, sort of just provide further backing and support to the next steps of the project and show that, you know, we wouldn't have picked, um, the [...] just because, but that both its responded to all the things, and that it represents [...], so sort of a cross reference to say, this is why, because there may be, as part of this project, there may be some interviews done, so that was one of the reasons to do the scoping was to figure out, well to help with the decision process around who to interview [...]. So if particularly, mainly in any write up we would be able to say, this organisation, this association was picked because x, y and z." (P2)</i></p> <p><i>"And I just wanted to say that that doesn't actually particularly help local authority decision makers. It's purely done to make the article I'm writing more appealing to higher ranking journal editors." (P3)</i></p>

<p>Effects of narrow perceptions of evidence</p>	<p>Highlighting that it's about the perceptions of other people as well as what the participants think about evidence. Focuses on the problems encountered because of other people's different opinions. It shares this element of tension with other codes, and although not many segments of data organised here, they are important, because they illuminate the struggle to reconcile what participants own perceptions of evidence are, and what they need them to be in order to do their work, and the perceptions of other people.</p>	<p>P8, P11, P13</p>	<p><i>"There's a bit of evidence in the academic evidence, there's a lot of personal experience, there's a lot of, you know, political judgements, you know those are some of the – and there are some pragmatic attempts that are to do with the resources that are available. Quite a lot of the time I think, and indeed I think that some of the stuff that Sally Davies has put out recently, there's almost a delusion that's around, which is that we're a very rational profession that takes actions that are primarily informed by in inverted commas, 'scientific evidence'. That's just not true." (P8)</i></p> <p><i>"I think, I mean in the reality with a thing like this you know you've got a committee with a much broader conceptions of health and there's better literacy now. Yeah, but you still do get the doctors coming along, they know best and this is the only thing that really matters but that's just professional protectionism. They can't win the arguments because it's illogical. I suppose in a way...yeah, I suppose you know there's still this, there still is a medical hegemony I'd say, but...and with all the epistemology that goes with it, but it doesn't win</i></p>
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			<i>the day. It's dying. It's dying, those sorts of views of health. You're taking a model you know and applying it to social change and it's not appropriate to apply that model."</i> (P13)
Evaluating information	Applied where participants made comments that indicated a questioning or evaluative approach to information. Participants seem to consider information in quite an in-depth way. Includes cases where participants looked at facts and figures and attempt to check or reverse engineer them. Also instances where participants consider whether they agree with information. However participants would also look not just at what they agreed or disagreed with, but what they could not discern from the information given. There were a number of instances where participants articulated a desire for more complete information e.g. to know how something mentioned in the article had been defined, or to know what type of population had been involved in the research.	P1, P2, P3, P4, P5, P6, P7, P8, P9, P11, P12, P13, P14	<i>"Yeah I mean you know, the general sort of story wasn't new to me. Obviously I don't carry all those statistics at the front of my mind all the time because it's not the area that I'm working in, but you know, the sort of statistics that children born since the 1980s are up to 3 times more likely than older generations to be overweight or obese by the age of 10, you know and latest figures from England suggest a fifth of children joining primary school are not obese or overweight, you know they are very dramatic, sort of significant figures." (P4)</i>  <i>"...I will tend to read articles that are relevant to whatever it is I'm doing at that particular point in time, and so if I see a heading that looks like it's really outrageous, like you know, they've discovered a new micro-nutrient that cures cancer or something I will generally completely dismiss that and won't even both reading the article</i>

			<p><i>because I think it's a load of nonsense. So sometimes there will be diet related stories and they are always in the media about all sorts of crap and I just zone out, but in some way's it's also annoying because other people do read them and they ask me..".(P6)</i></p>
Evidence/Evidence Based Practice*	Used or categorise instances where participants use the term evidence, but also where they describe information in a way that is thought to refer to evidence (even if that term is not used). 'Evidence' is applied as a code wherever there is a use of information as a basis for recommendations, as a justification, as a support for an argument or making a case.	P1, P2, P3, P4, P5, P6, P7, P8, P9, P10, P11, P12, P13, P14	<p><i>"So I haven't got the answers, my next step is another strategy for trying to get information, which is that I spoke to [...] who is the head of policy for [...], so that next time she goes along to the [...], it's a question she can ask and I think that's probably the route that I want to pursue since I haven't yet managed to find an authoritative view, which is to keep on asking the prompting questions. I also asked [...] from [...] who had no particular evidence either way." (P1)</i></p> <p><i>"Well, I think as a researcher I would like to see the research methods, I understand they are not in there, but want to see what type of review it is, what the, you know what was included, what data was included, stuff like that." (P11)</i></p>

<p>Evidence is a mixture of things</p>	<p>Applied where evidence is described as being a mixture of thing. Seems to express some kind of tension between scientific journal publications, and other forms of information. Does not rely on participants actually describing the information they were using as evidence – they didn't have to use that word in the data in order for the quote to be coded here. This is my interpretation of evidence, not necessarily theirs. Basically any situation where they have described a use of information in a way that suggests use as a basis for recommendations, as a justification, as a support for an argument or making a case, I am interpreting that as constituting use as evidence.</p>	<p>P6, P8, P11, P13</p>	<p><i>"[...] good evidence is, comes from a variety of different sources. So of course, good quality research, academic research is one element. Probably much more relevant is good quality grey literature, because it's much more real time, it's often written within the current policy context. One of the problems that a lot of research has is that it can often be you know, ten years old actually, from when the original research was done. And then if you go back even further to when the funding was made available to commission that, you know, so it's already often been done in a different policy context. So grey literature. The third bit of evidence, I think is – particularly these days – is how people interpret their local circumstances, and in particular so then the question is who are the people who are good at interpreting that? Well some of those would be, like with the [...] example, the people who are actually living in those communities and working in them" (P8)</i></p> <p><i>"There isn't, first of all, there isn't much available that meets the standards. I mean those 13,000 that I talk about, we've got those down to about</i></p>
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			<p><i>50, which is quite a lot for a [...] review. Sometimes you only have one or two. So that's why you have to have a pluralistic view of the evidence, and you get, you can, if you get an expert coming along, then you have to have- every recommendation that you make you have to have an audit trail of the evidence. So you can't just make a recommendation without attributing the evidence to make that statement". (P13)</i></p>
<p>Expert information and witness</p>	<p>Experts and expertise appear in a number of the participant interviews. Applied to any material that mentions expert or expertise. Also anything where participants mention people or groups of people in such a way as to suggest that they are likely to be possessed of reliable or superior knowledge or information. So there is some overlap here with 'authority' in that some of the quotes refer to credible scientists etc. There is also reference to people with qualifications e.g. Dr or title e.g. Sir. In these cases the quotations are coded here because participants may feel that these people are presented to them as</p>	<p>P1, P4, P5, P6, P7, P8, P9, P10, P13</p>	<p><i>"Obviously it's a kind of, it's a growing field with relatively limited expertise [...] So on something like [...], there's kind of, there's the theory and the practice of how people engage with [...] which is kind of an academic field in itself, and there's the kind of technical how you build it, so, you do a lot of pre-reading on something like that. And then I guess it's tracking down the technical experts and then that's a mixture of people you've worked with before, people in house and people in the [...] teams. You know you kind of start – I wouldn't start approaching a problem with someone else</i></p>



	<p>experts – whether they accept them as such or not. The difference between this material and that organised under ‘It’s good to have the authority’ is that authority as a code also included documentary sources, while this code of expert information is focused on people as sources of information.</p>		<p><i>until I’ve done a bit of background reading, do you see what I mean?" (P9)</i></p> <p><i>"So, I looked at a bunch of sources, things that were already out there, things that were aimed at [...]. We didn't want to reinvent the wheel or, try and kind of say, we're experts on [...], you should do this, this and this because clearly we are not." (P10)</i></p>
<p>Facts and truth</p>	<p>Applied where participants make specific reference to ‘fact’, objectivity, truth, including whether something is true or not, and also ‘proof’. However, these specific terms do not have to have been used in order for the code to apply. It also represents situations where participants talk about interacting with information in a way that suggests that they are hoping it will provide them with a definitive or perhaps authoritative understanding of the world – something which they can more easily believe is right or correct.</p>	<p>P1, P2, P3, P4, P5, P6, P7, P8, P9, P10, P11, P12, P13, P14</p>	<p><i>"So it's like many syndromes, or spectrum disorders, since it sits on a spectrum It's quite hard to know exactly how to read that but, the CDC figure was much higher than other figures that I've seen, that seem to suggest that it's more in the region of 5, er, 1000 or 0.5 per 100. That's a huge difference and it does make a difference. The difficulty is, I think is that I was beginning to pick up that if you're doing it from medical records it's less likely that people would actually have such a diagnosis". (P1)</i></p> <p><i>"I needed to know what kind of harms [...] was associated with...I then needed to know how high income European countries stood in comparison</i></p>

			<p><i>with those global figures. I wasn't requiring a great deal of numerical precision. I mean, I wanted the evidence to be good, but I wasn't going to report the numbers in any great detail. I wanted to be able to say, [...] is a major global public health issue, and it's a particular issue in European countries". (P3)</i></p>
<p>Framing an issue</p>	<p>Applied to instances where participants appear to be using information to adapt communications to better appeal to others. Framing involves looking ahead at how another person may react to a communication, and trying to present that communication in a way that will ensure receptiveness or a favourable reaction.</p>	<p>P1, P3, P4, P5, P13</p>	<p><i>"At this point, I knew more about [...] policy in the one borough that we'd been working intensely with than I did about, let's say its international framing, or even its national level policy. I mean I know quite a fair amount of information, but I very quickly had to produce something that could fit expectations of what an introduction would look like." (P3)</i></p> <p><i>"The aim is to update our policy asks and to include, and to sort of fill the gaps I suppose. So there's a whole process there about how we do that, in the light of the current government. So there's some sort of possible re-framing of the way we talk about them that might be more relevant to the current politics". (P4)</i></p>

<p>Good quality grey literature is more relevant</p>	<p>Applied where participants mention the importance of grey literature. However, the important thing to this code is not how grey literature is defined as a form of information, or so much what qualities it possesses that differentiates it from published literature. It's actually grouping quotations that explore the need to step away from supposedly scientific, empirical and objective research, and take greater account of people's subjective reality. Although some of the quotes mention grey literature as a specific phrase, not all of them do. Together they define the importance of non journal information. In some cases this may still be information authored by academics, but in other cases, there is a whole spectrum of information out there which could still be of interest.</p>	<p>P6, P8, P13</p>	<p><i>"Er, yeah, I think there's pros and cons, because I think we tend to be more outward looking and open to exploring the grey literature, er, because yeah, as far as I'm concerned evidence is not just what is published in scientific journals. As someone working in an [...] it's actually often quite hard to access that evidence, and also I find it's not always produced in a way that's directly of use to me. So I'm more inclined to look at evidence that's produced by academics, that [...] report was produced by [...], a well renowned academic in [...], but for the [...] advocacy community for policy makers, to influence policy, and so the way it was summarised and presented was in a very accessible way to me." (P6)</i></p> <p><i>"And the other thing that the experts bring in is the grey literature. So you know, I mean we do look, I mean I remember in [...] we did look systematically at good practice guidelines and things like that, and barriers and opportunities to introducing change in [...]. And those are the sorts of things</i></p>
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			<i>you need, because it's about implementation knowledge, not just subject knowledge." (P13)</i>
How do we make sure everyone is on the same page	Using information to make sure everyone is in agreement and has a shared knowledge base about something, before going on the develop a case for policy change. So it's a necessary first step before influence. Not actually about influence itself, but about getting a group of people to work together, ensuring that they have a shared frame of reference, and to some degree a shared reality. Implicit in this is the idea that everyone may not have been on the same page before – and this goes back to the fact that everyone has subjective perspectives – we all have our own different opinions, ideas and knowledge. To an extent those may be amenable to change – may depend on the person – and this change may be accomplished with the help of information to add new knowledge.	P4, P6, P7, P8, P10, P13	<p><i>"[...] because I'm in the privileged position of doing this full time and having a lot of the knowledge that, er, [...] my colleague imparted at that meeting already, but it, but actually it was really valuable because not everybody in that room was on the same page, and really kind of understood because people were coming from different perspectives, er, so it was an important pre-requisite...to share that knowledge to get people into the space where then we can have acceptance, and agreement and understanding on why having a policy ask in this area is important." (P4)</i></p> <p><i>"[...] the purpose of the [...] is to explore the possibility for a coalition partnership amongst the [...], to speak with one voice rather than disparate voices. [...] another group were doing exactly the same thing that we were trying to do, and that would obviously present an opportunity for us to either collaborate together, or if we were going towards similar but separate ends, it might be a bit</i></p>

			<p><i>of a threat for what we were trying to do. So I was tasked by...the working group who I work on behalf of, to find out, to get in touch, to firstly identify if that was true, who was doing it, who was leading the work, what their aims were, what their timelines were, er, do they feed into us, are they willing to cooperate with us, is their work something we want to support as well?" (P7)</i></p>
<p>I need evidence to be presented in a way that's useful</p>	<p>This is about the participants having access to the kind of information that they need to make sense of information. So in practice this refers to things like having the ability to see the entirety of information, having knowledge of the source of information, where it came from e.g. a citation to a report or name of the organisation that produced it. This information is theorized to be useful to participants in understanding how good this information is – how close is it to reality, whether it is something that is relevant to them and that they can use in some way.</p>	<p>P2, P3, P4, P6, P11, P13, P14</p>	<p><i>"Yeah, and then just at the end of the article it finally mentions that the British Heart Foundation is the charity that's saying that people aren't exercising very much, and then it provides a list of statistics, I guess it's percentage of adults that are not doing...not doing moderate exercise, but it doesn't provide any link or further citation of where those statistics are coming from. So I'd probably flag that as something to..." (P2)</i></p> <p><i>"Well, I think as a researcher I would like to see the research methods, I understand they are not in there, but want to see what type of review it is, what the, you know what was included, what data was included, stuff like that." (P11)</i></p>

<p>In order to get some headlines</p>	<p>Applied to situations where participants describe Interactions with information which involved an element of provocation or attention grabbing. There is often an underlying attempt to influence. In each case participants report situations where they have either tried or succeeded through their actions either intentionally or unintentionally to have some effect on thinking, knowledge or awareness in themselves and/or other people.</p>	<p>P1, P8, P12, P14</p>	<p><i>"[...] my hope is, you can see it's probably twofold, one is to get the answer for myself and the other is to provoke other people to ask the same question just in case there is something out there that has been missed recently." (P1)</i></p> <p><i>"So, I mean there was impact in terms of...of there being presence of people from that group and that community at future events that would not have otherwise happened. So for example the [...] events on [...] we were kind of proactive particularly in trying to get people there with. We've also presented on it in a couple of spaces which were specifically about [...] health as well, so there's been it's helped raise the issue of [...] within [...] discussions." (P12)</i></p>
<p>Influence*</p>	<p>Several participants talk about wanting to influence policy, and there's also mention of trying to influence businesses and other national organisations. There's a sense of powerlessness almost, because it's about not being in a position of power, and seeking to get people who are in a position of power to</p>	<p>P1, P2, P3, P4, P5, P6, P7, P8, P9, P10, P11, P12, P13, P14</p>	<p><i>"We thought it would be a good idea to have someone who was an [...] expert involved and have a practical example of a specific way of working, because our guidance was definitely not, do this, do this, do this, it was more these are the sorts of things you need to think about, it depends what you're doing, you decide. So we wanted to</i></p>

	<p>do what you want them to do. When participants talk about influence they are frequently also talking about using evidence, and more specifically about certain things that they use as evidence. These discussions highlight the importance of several other concepts in the activity of influencing, and also suggest links between this concept and some of the codes developed.</p>		<p><i>have a kind of concrete example of one approach."</i> (P10)</p> <p><i>" So that's what happens, so the committee looks at those reviews, what you have is evidence statements and then you have to decide whether you agree with the evidence statement or not, and to what extent you can build a recommendation around it. So for example, you might look at what's the evidence that [...] have reduced [...]?"</i> (P13)</p>
<p>It's good to have the authority</p>	<p>Applied to quotations where the word authority or authoritative has been used to refer to information or a source of information during participants interactions. Synonymous terms thought to include, credible, reliable, reputable. Other quotations mention something sounding authoritative by virtue of the organisation that has produced it, e.g. sometimes used to refer to a University as a source of material, the University being thought to be likely to be an authoritative source. Also includes information which is implied to be 'good' via method of production</p>	<p>P1, P2, P3, P4, P5, P6, P7, P9, P11, P14</p>	<p><i>"So, paragraph one - and this is how I do it, I go home, hide from the office for a few days so I can get some peace, sit on my bed with my lap top and first of all do paragraph one, which is basically when you, or when I, say that [...] is an international problem. And then I pull in literature, preferably some from WHO and others from systematic reviews to underline that basic point, that it's an international problem."</i> (P3)</p> <p><i>"Yes, you know and it says Kings College London, oh, it says University College London there, and it says Kings College under the table, but you presume they're all collaborating...you see yes, it's</i></p>

	e.g. participants refer to looking out for a systematic review on something which is generally thought to be a more robust, reliable form of evidence.		<i>things like that that give it credibility, you see it's published in a journal and it's the BBC reporting it, not the Daily Express." (P4)</i>
Looking for consequences	Applied where data relates to attempt to explain the world in terms of causation or results of actions and inactions. This has links to facts and objective truths. It seems to exemplify the participant's searches for information that will help them predict outcomes with some degree of certainty. Cuts across situations where participants were attempting to influence the development of policy recommendations or policy makers and more administrative situations where influence of others to a course of action seemed absent.	P1, P2, P3, P4, P5, P6, P7, P8, P9, P10, P11, P12, P13, P14	<i>"Evaluation of knowledge services is incredibly difficult, because you're trying to say we found this evidence and it had this effect on policy, but if you know anything about policy, you know it doesn't work in a linear fashion. So finding those bits of evidence and proving that they've influenced the narrative sufficiently enough to claim an impact is very, very hard." (P9)</i>  <i>"Then, so there I've just read the bit about how, the cost [...] that kind of thing makes me quite angry because I know that schools budgets are under a lot of pressure and I know that if they don't protect that part of the budget that the chances are that certainly some schools might just start spending money on other things because they're under pressure to raise standards and it's probably too early to start having concrete proof that having</i>



			<i>better nutrition is raising standards [...] there's not much evidence for it yet." (P10)</i>
Need to be evidence based can be a barrier	Applied where participants describe decisions made about public health interventions because there is no evidence – because other people are saying there is no evidence, or in some cases that the evidence that is there is not good enough. Captures the fact that there are other influences on the provision or use of evidence which cause participant's problems. Can include situations where participants are asked to find evidence or to produce evidence themselves, but are unable to or find it challenging to do so.	P5, P7, P10, P12, P13	<p><i>"Yeah, I think, it is really important, so important with the understanding that when it becomes a barrier, but it will always be the desired effect and I think that's shared amongst the sector that we will always strive to get that evidence. If it is within our reach we will fund it, and we will follow what we call, what the evidence says. I think that's what we've got a very good understanding of at [...] is...commonly we commission research, and it might come up with results we don't like, but we listen to it. Whereas I don't think every organisation does that". (P7)</i></p> <p><i>"There were public health people there as well, and we wanted them to be able to understand a bit more about the challenges that [...] face in trying to [...] because they are often very small organisations that are lacking in resources and capacity." (P10)</i></p>

<p>Obviously quantitative evidence is better than qualitative</p>	<p>Different forms of information i.e. quant vs. qual are important at different times, and add different things. Seems to be a suggestion that qualitative research is better at understanding complex situations than quantitative.</p> <p>Developed around occasional mentions of the merits of quantitative or qualitative research in the interviews, with different participants sometimes referring to this or expressing a preference for one or the other.</p>	<p>P9, P11, P12</p>	<p><i>"So we thought that was quite an interesting finding [...] and our studies are usually embedded in larger quantitative studies and they always just look at individuals, in our unit we do objective measurements [...] but of course what these studies can't do, they just look at the individual and say, clearly through their questionnaire, through their objective measures they seem to be healthy [...] This part of the study doesn't realise that this person [...]."</i> (P11)</p> <p><i>"Er...so I mean, there's a fair amount of kind of quantitative data you get from public agencies normally, and I would include that although that's always taken with a pinch of salt because of the way in which it's collected, the questions that are asked...you know any kind of representation of reality is always kind of a reduction of reality. And with kind of qualitative evidence, it's, I would say... so you know the experience of people as they perceive the world and as they perceive what's going on around them is critical especially</i></p>
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			<i>when...you know you're kind of dealing with the idea of health or wellbeing." (P12)</i>
People want to reject evidence when it cuts against their views	About people approaching evidence and being influenced by personal or professional agenda, rather than taking the information purely on its merits. Participants experience and recognise this feeling in themselves – sometimes it is openly acknowledged as a potential negative point in their reactions to information. In other cases, it arises in situations where participants are perhaps not consciously thinking about their reaction to information as being either biased or unbiased. Personal knowledge is sometimes used as criteria for making judgments on information e.g. whether to believe something or not, effectively whether it fits with what they already know, or if they think something is nonsense. It's also recognised in other people, both real and hypothetical.	P4, P5, P6, P7, P8, P9, P10, P11, P12, P14	<i>"you know, I openly admit that I am more likely to fall on the evidence which is going to tell me that this it needed and this is important, I'll be like, yes, that evidence is correct and the other evidence must be, you know." (P5)</i>  <i>"Public health suffers to some extent in the public imagination from a, problem of, 'well, I could have told you that', you know stating the bleeding obvious about how having too many takeaways might make you fat and so on. But at the same time people want to reject evidence when it cuts against their pre-existing views: "it's all about personal choice" or "my uncle ate red meat all his life and live to 93"." (P9)</i>
Public health and public	Describes the feeling that public health research is not the only influence on public	P3, P4, P5, P6, P7, P8,	<i>"Well, there's a sort of tension that does concern me in that er, the...yes it does, I mean</i>

<p>health research are not always the same</p>	<p>health. This code initially developed with a strong focus on the political pressures which participants indicated affected their experiences. Applied where participants describe other factors than information as an influence on public health action. Could include understanding how other people who influence decision makers view and perceive evidence and effect this has. Also references to evidence that may be generated or applied with self interested motives. Also instances where participants state that it can be difficult to get evidence out there in the form in which you think it should really be, because people who control channels of information may have a difference opinion of how it needs to be.</p>	<p>P9, P11, P12, P13, P14</p>	<p><i>pragmatically that's what it's for and I guess it justified when you put it that way. There's a less justifiable way putting it, which is you know, I mean...it could be that the effort we put into focusing on how to make something appealing to a journal editor would be better spent focusing even more on how to make the evidence useful to the people who are actually going to use it." (P3)</i></p> <p><i>"Well, if it says it's published in a peer reviewed journal that gives it a sort of seal of approval. Even so, you do have to be careful because if there are industrial interests, commercial interests that may have sponsored those papers, there is pretty good evidence across quite a few public health areas that that would shape the interpretation of whatever they found. Not necessarily change the data they found, or that they would be selective in their data, but it can put a shape to it. So, one would want to know that this hadn't been paid for by someone with a commercial interest. I think in general in childhood obesity there isn't much commercial interest to make a story like this, if anything it would go the other way, there would be</i></p>
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			<i>commercial interests trying to show that childhood obesity has levelled off and that we've nearly solved the problem and not to worry, go out and enjoy a KitKat." (P14)</i>
RCTs are often not the answer	The data organised here represents cases where participants raise the idea of hierarchies of evidence which place RCTs at the top of that hierarchy and regard them as the best form of evidence. The terms hierarchy of evidence and RCTs or clinical trials don't have to be used although they do feature in many of the quotes here. The key idea is the expression that there are certain situations where RCTs simply cannot answer the questions needed, or other forms of information are better for answering those questions.	P6, P7, P9, P11, P13	<p><i>"Yeah, I don't think I have an answer, but I definitely know that I don't fully agree with you know, the evidence hierarchy that you have for medicine, you know clinical medicine I don't think that's appropriate for public health. And on occasion I will criticise evidence produced say by the industry, which is going against public health objectives because I might think it's biased in some way. So yeah, it depends on the context". (P6)</i></p> <p><i>"And I think that it's interesting in the group that I'm in that we have a strong emphasis on the importance of qualitative research as part of the research package. In a world of complex public health interventions, RCTs are lovely if you can do them, but actually, they're not the answer often, to the problems that we're trying to." (P9)</i></p>

<p>Understanding local context is important evidence</p>	<p>Applied to data which emphasises the importance of local contextual information or understanding. This is cited in examples where the participants talk about the need not only to understand whether an intervention will work but also whether people who are affected by it will actually want it. Many of the data here also contrast this form of information against other forms which would be regarded as more objective or quantitative. Similar to the codes for evidence is a mixture of things and quant is better than qual, and good quality grey literature. It doesn't matter so much what the participants perceptions are, whether they differ from one another – that element is not present in this code whereas it was a bit more obvious in the quant vs. qual data.</p>	<p>P6, P8, P12, P13</p>	<p><i>"And from my experience, certainly when I was working in [...] in terms of shaping local policy, we used things like local surveys of the public, what did parents think about [...], and used the information gained from those kind of surveys to inform the policy that we were developing." (P6)</i></p> <p><i>"The third bit of evidence, I think is – particularly these days – is how people interpret their local circumstances, and in particular so then the question is who are the people who are good at interpreting that? Well some of those would be, like with the [name of organisation] example, the people who are actually living in those communities and working in them" (P8)</i></p>
<p>Verifying and cross checking information</p>	<p>Applied where participants describe using information to verify and cross check facts before proceeding. This code grew from participant 2, and has not been seen</p>	<p>P2, P11</p>	<p><i>"I also did just a quick scan, kind of Google searching with a couple of terms just associated with [...], just to see if there was any additional statements, or public, anything publicly available</i></p>

	<p>elsewhere, but represents a cautious approach to information. It's about having back up and checking you have your facts straight before you present them to anyone who might be inclined to question them. It's not about what participants themselves think about information, it's about their preparation for what other people will think.</p>		<p><i>that would link back [...]. So things like, if there was anything in an annual [...] report [...]" (P2)</i></p> <p><i>"I started giving a summary I guess of the study itself and why we did and what our findings are, so what our current thinking is, you know where to take it next. So that was kind of, quite a brief summary [...] and then they were in little groups, so I kind of set group questions for them [...] so they were for example, what did you make of our findings [...] did we get it right?" (P11)</i></p>
<p>We weren't going to have all the answers</p>	<p>This code highlights a strong element of questioning and uncertainty in the way in which participants interact with information. Participants are often questioning aspects of information such as how things have been defined, who has been involved or included, where information has come from, who has been responsible for producing it, or when things are supposed to happen. There are also day to day situations where participants encounter uncertainty with regard to information. Again this is seen in situations</p>	<p>P1, P2, P3, P4, P5, P6, P7, P8, P11, P12, P13, P14</p>	<p><i>"I did feel frustrated because I thought, there must be an answer, and I found it quite interesting that the CDC answer and the UK answer seemed to be quite divergent and I've talked so far about incidence and prevalence, but the one I've ignored is dose-response. So currently the response of most people when talking about [...] is ah, yeah, but you have to [...] to do harm to your child, and I'm actually thinking well I don't really know that I don't really know that, I don't know what the [...] relationship is, it's clear that, well it's not clear, I was going say that it's clear that [...] would do no</i></p>

	<p>where they have not been able to find definitive answers to questions that they have experienced. This is not necessarily the result of not being able to find any information it all – it can be because information has been found, but there is a conflict.</p>		<p><i>harm, but I don't know that. I can't say that because I don't know that." (P1)</i></p> <p><i>"So, I think there was a point at which I was probably thinking 'Oh gosh, I really do have to understand all this complexity', but then realising that actually that wasn't going to be possible and that wasn't the point, and you can spend years on trying to become, you know, the expert, when there are actually experts out there. So it's more about...making sure that we can have a reasonable ask, but without necessarily having all the answers ourselves." (P4)</i></p>
<p>You have to have an audit trail of evidence</p>	<p>Applied where participants describe need to use evidence as back-up to arguments, statements and recommendations, wherever the specific term 'evidence' had been used. Also where underlying application of information for the purpose of rationalisation or justification thought to exist even if the term evidence is not specifically been used.</p>	<p>P1, P2, P3, P4, P5, P6, P7, P8, P10, P11, P12, P13, P14</p>	<p><i>"So yes, there is the official lists [...], but when you actually have a PDF of a document that's clearly from...I don't know, like the [...], and you actually have what they, you know, their language in front of you, um, you feel much more confident." (P2)</i></p> <p><i>"The other frustrating thing is, I was reminded when I met with the [...] recently, public health, everybody gets it, you know they know what needs to be done, they need more analysis and data, you know middle of the road politicians understand it,</i></p>



			<i>irrespective of their ideological perspective. But what the [...], we had a [...] visit us recently, and they said we totally get this, we want the analysis, we want the impact analysis and all that, but bear in mind you are required to produce a higher burden of proof than everyone else. So they expect a higher burden of proof than everyone else, because you're challenging the status quo [...]." (P13)</i>
You're trying to build a case	Applied where participants describe using information to support an argument for something. That argument does not have to extend as far as arguing for a course of action or for something to change. It can be to argue that the world is in a certain state without suggesting doing anything about it. It can be to argue that something is important or that something has already occurred if there is a chance this will not be believed. It's not the content of the argument or its goal that is important to this code therefore, it is the fact	P1, P2, P3, P4, P6, P7, P8, P9, P10, P11, P12, P13, P14	<i>"So...it is important...if only to be able to assess kind of effect, you know, so that you're not kind of doing something without any kind of idea as to what is happening. I would say there are issues so, they're using the example there of where there aren't really any specialised services, there's no real attention, from any significant health body, in part because there'll be the demand that you have to show er, that you have to demonstrate evidence before you can, or demonstrate evidence of need, er, so you know I think the need to be evidence based can be, can be used as a barrier in that way." (P12)</i>

	that it represents use of information to support an argument, or any kind.		<i>"But it's, the idea is to build a case, with 'shocking figures' for [...] if nothing is done, and therefore to strengthen the argument that governments really should act if they don't want to see this unfolding".</i> (P14)
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## Appendix 9: Table showing organisation of open codes within selective codes

Selective code	Open codes
Personal experience, knowledge and perception of information	<ul style="list-style-type: none"> <li>• Good quality grey lit is more relevant</li> <li>• Quantitative evidence is better than qualitative</li> <li>• Understanding local context is important evidence</li> <li>• Evidence is a mixture of things</li> <li>• Facts and truth</li> <li>• People want to reject evidence when it cuts against their views</li> </ul>
Experience of external perceptions of information	<ul style="list-style-type: none"> <li>• RCTs are often not the answer</li> <li>• Need to be evidence based can be a barrier</li> <li>• Effects of narrow perceptions of evidence</li> <li>• Public health and public health research are not the same</li> </ul>
Evaluation and integration of information: Authority, Experts and Relevance	<ul style="list-style-type: none"> <li>• Checking a specific source</li> <li>• Expert information and witness</li> <li>• It's good to have the authority</li> <li>• Constructing options for moving forward</li> <li>• I need info to be presented in a way that's useful to me</li> <li>• Verifying and cross checking information</li> <li>• Evaluating information</li> <li>• We weren't going to have all the answers</li> </ul>
Influence	<ul style="list-style-type: none"> <li>• Decision making</li> <li>• Looking for consequences</li> <li>• You have to have an audit trail of evidence</li> </ul>
Strategies/tactics of influential information use	<ul style="list-style-type: none"> <li>• In order to get some headlines</li> <li>• You're trying to build a case</li> <li>• Framing an issue</li> <li>• How do we make sure everyone is on the same page</li> </ul>

## Appendix 10: Code book showing definitions and example quotations of selective codes

Code	Definition	Relevant participants	Example interview quotations
<b>Personal experience, knowledge &amp; perception of information</b>	<p>Personal experiences and interactions with information are comprised of a wide range of elements. Used where participants draw on their experience or knowledge of a topic to understand what is in front of them, or as a basis for judgments of information. Past experiences and knowledge include the level of understanding that they feel they have about something. In some instances participants are aware of or are acknowledging the effect that their existing knowledge or opinions have on their reactions to information.</p> <p>Participants often also think about how information will have been created - they use their existing knowledge to understand this, and consequently to spot any issues with that information or</p>	<p>P1, P2, P3, P4, P5, P6, P7, P8, P9, P10, P11, P12, P13, P14</p>	<p><i>"The CDC is suggesting something between...I think it actually said something like 1-4% of the population with [...]. [...] doesn't show physically necessarily. That got me into thinking about the diagnosis because I was actually saying you diagnose it in part from the characteristics, the behavioural characteristics that are seen [...], and in part from the history of [...] if that is known."</i> (P1)</p> <p><i>" So when someone says that it was due as this article did to cheaper calories in the 1980s, there are several other potential sources of, yes, indeed, confounding factors or alternative hypotheses as to why the evidence is showing what it's showing. But that comes from my experience, and if I was reading one of the other of your documents about a public health area that I'm less familiar with, obviously I may not have that breadth of understanding of how these things have come about, and I would probably then take for granted whatever the author of the paper had been quoted as saying, that it</i></p>

	to understand why the information is the way that it is.		<i>was cheaper calories. I wouldn't be able to think of an alternative hypothesis." (P14)</i>
<b>Experience of external perceptions of information</b>	Used where participants indicate awareness or importance of other people's opinions - something in the data that shows that public health is seen as a 'we' - a collective community of people. Can be about awareness of and preparation for the opinions or perceptions of other people. It's not just about people's perceptions of information and evidence as isolated phenomena, it's also about people's perceptions of the work and communications that participants carry out themselves - which is in its own way also a form of evidence.	P1, P2, P3, P4, P5, P6, P7, P8, P9, P10, P11, P12, P13	<p><i>"Second thing I want to say is that I want to justify focusing on a high income European country, which needs a bit of justification when you're working in public health, because obviously we aren't the countries with the biggest health problems. So then I wanted to find some evidence that said actually, where [...] is concerned, there is a serious problem in high income European countries such as the UK. So again, WHO was the best for that, they do comparisons of things, and they do indeed say that. So it's funny, I kind of already know what I want to say, and actually the structure is...it pre-exists for this particular article. I just need to find the evidence that says it." (P3)</i></p> <p><i>"But saying that, I mean even with the academic side I mean, we still do talk a lot, so even if we you know maybe reference papers, and we use papers to inform our ideas and our analysis and everything like that, I mean they're always, I mean it's normally a part of a collaboration, so you'll sit down and still talk about these things, and</i></p>

			<i>people say no, I don't think that or I think you should use this, this theory is more relevant or, so, that's always kind of the result of an interaction as well, or a process, at the same time I think." (P5)</i>
<b>Paths to influence</b>	Used where there is mention of some attempt to connect evidence or information with an attempt to influence another person e.g. through the use of an argument, supporting recommendations. Describes the connection between those strategies and influencing someone else. Paths to influence include an element of evaluation of information for a potential to influence and also thinking about the actual method of influence, e.g. mechanism of justification, argument, framing etc.	P1, P2, P3, P4, P5, P6, P7, P8, P9, P10, P11, P12, P13, P14	<p><i>" [...] helpful in that it... it will...support, sort of just provide further backing and support to the next steps of the project and show that, you know, we wouldn't have picked, um, the [...] just because, but that both [...], so sort of a cross reference to say, this is why, because there may be, as part of this project, there may be some interviews done, so that was one of the reasons to do the scoping was to figure out, well to help with the decision process around who to interview [...]. So if particularly, mainly in any write up we would be able to say, this organisation, this association was picked because x, y and z." (P2)</i></p> <p><i>"Ok, so we're going to ask government to do, and I don't quite know how it's going to be framed, we're going to ask them to ensure that [...] has a much higher priority in [...] in policies to limit [...]. Now, that's a very high level ask. What became clear to me when I was looking into this, was actually, when you start drilling down on what does</i></p>

			<p><i>that mean in practice, there's a huge number of, well firstly things I don't understand, and secondly, amongst the things that I do understand, I know that there are complexities, and I know that there are challenges. So, I...did that surprise me...I suppose what we had to make a decision about was that we weren't going to have all the answers. That we were going to say, this is really important, it needs to be done. We're not necessarily the people that have got the expertise to do it, for me personally, but government, you need to get your experts on to this."</i> (P4)</p>
<p><b>Evaluation and integration of information</b></p>	<p>Evaluation and integration of information into sense represents the specific elements which the participants look for when interacting with information. These specific elements include considering the relevance of information, it's authority, credibility, how it is defined, and can also include areas such as the way in which information is formatted and presented. This code does not represent the actual process of evaluation, which is a separate</p>	<p>P1, P2, P3, P4, P5, P6, P7, P8, P9, P10, P11, P12, P13, P14</p>	<p><i>" Well it just seems to be, it's interesting that they're picking a number but I'd like to see – it says for example Germany and Italy have seen big falls in consumption. Fine, well, a big fall is different from actual consumption isn't it, so I don't know whether they're still above us or below us according to this. This just shows actual consumption, so I'd probably go and have a look at, try and find [...]"</i> (P8)</p> <p><i>" Yeah, I think it's the quality of the research [...] a lot of those use a lot of estimates, and I worked abroad a bit in</i></p>

	<p>theoretical code which describes the way in which the participants perceptions and knowledge influence and mediate the integration of information into sense, or rather how the participants perceptions and knowledge influence the way in which they approach elements such as authority and credibility and the way in which they perceive those elements.</p>		<p><i>countries that tend to be estimated, and I know how often they get it wrong. So little things like that where I think I just want to see how it's been done, I think just the background, I think I find it interesting, an interesting through, I think it might be something nice to use as an example [...] but before I think I would want to re-use it in an argument I would want to know that this is something solid to refer back to." (P11)</i></p>
<p><b>Influence</b></p>	<p>The concept of influence is about understanding how participants go about trying to achieve influence and most importantly for this research, the importance that is given to information (or more specifically evidence) in achieving influence. Through the role of evidence in achieving influence, connections between this concept and other concepts in this research can also be seen. Goals of influence can include</p>	<p>P1, P2, P3, P4, P5, P6, P7, P8, P9, P10, P11, P12, P13, P14</p>	<p><i>" We thought it would be a good idea to have someone who was an [...] expert involved and have a practical example of a specific way of working, because our guidance was definitely not, do this, do this, do this, it was more these are the sorts of things you need to think about, it depends what you're doing, you decide. So we wanted to have a kind of concrete example of one approach." (P10)</i></p> <p><i>"So that's what happens, so the committee looks at those reviews, what you have is evidence statements and then</i></p>



	<p>long term aims such as policy change, and also short term aims where participants have a more immediate desire to draw attention to a certain issue - perhaps participants see getting attention as a first step towards influencing people to actually make a change, influencing other people may include getting these people to change their thinking on an issue or think about something new, and getting a group of individuals to agree on the importance of an issue as a preliminary step before carrying out more work towards achieving more long term influence with policy makers on that issue.</p>		<p><i>you have to decide whether you agree with the evidence statement or not, and to what extent you can build a recommendation around it. So for example, you might look at what's the evidence that [...] have reduced [...]?"</i> (P13)</p>
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## Appendix 11: Code book for theoretical codes

Code	Definition	Relevant participants	Example interview quotations
<b>Evidence Based Practice</b>	<p>Used for data that describes this particular way of interacting with information. Different elements of the data represent different aspects of EBP. Code demonstrates the link between the different selective codes to do with the ways in which individuals experience information themselves, and what they know about the way in which other people perceive information. It also highlights the effect that a view of information as evidence, and a will to engage in EBP has on the way in which specific instances of information are dealt with.</p>	<p>P1, P2, P3, P4, P5, P6, P7, P8, P9, P10, P11, P12, P13, P14</p>	<p><i>" I had already said to [...], you ought to, in the harms of [...], you ought to include [...].and at that point I wanted to say to myself, yeah that's a reasonable line to take but where in the scale of harms would you place it. So I needed to, I felt uncomfortable having said it without having some good evidence to back it up."</i> (P1)</p> <p><i>"What do I want to say next, I want to say that local [...] policies vary in the UK. How did I find that out...we've been doing some, well colleagues have been doing some work on that anyway. So I kind of knew where to go to. They weren't colleagues from [...] but they were, you know, the people that I know from within the research network that I have. So it wasn't that difficult finding work that made that point. And then I did some Googling and found an [...] paper which also made a similar point. So what have I done I've got from the international [...] problem to</i></p>

			<i>justifying why we focus on a European country like the UK, and then to raise the problem that er, local [...] policies vary."</i> (P3)
<b>Interaction between individual knowledge-experience frameworks informs integration and evaluation of information</b>	Used where data highlights the interactions between information and individual experience, knowledge and interpretations of EBP. Can include participants making comments that suggest that they are drawing on past experience and knowledge to interpret or understanding information, reference to affect of personal opinions on interpretation of information and understandings of whether or not something constitutes 'evidence' by reason of any specific criteria referenced.	P1, P2, P3, P4, P5, P6, P7, P8, P9, P10, P11, P12, P14	<i>" Oh, and then it's depressing because adults who are psychologically controlled as children are more likely to have poor mental health. And then I guess therefore then have poor mental health for their children. Gosh, they're using very stark comparisons, so 'UCL researchers likened the impact to that of the death of a close friend or relative'...Ok so it was a study by UCL researchers, respectable institution..."</i> (P6)  <i>" So the bit about encouraging companies to reformulate their products stood out to me, because I've been thinking about that myself [...] So there's part of me thinking yeah, definitely encourage the companies, very important"</i> (P10)
<b>Integration and evaluation of information to</b>	As information is made sense of, it ceases to be separate from the participant. The participant	P1, P2, P3, P4, P5, P6,	<i>" And they produced a guide for that, which we, and that was with a [...] organisation, and so provided sort of like comment and input and you know again the notes from the session were</i>

<p><b>develop potential to influence</b></p>	<p>changes and is changed by the information through sense-making. Used for data that indicates how, as participants begin to understand information, they begin to look for signs of the potential influence that the results of the sense-making exercise they are engaged in might have on other individuals operating within the context of EBP. This involves understanding what those sense-making outputs consist of – whether they will be viewed as objective or subjective information and what qualities they possess in terms of authority, relevance and authenticity.</p>	<p>P7, P8, P11, P12, P13, P14</p>	<p><i>to some extent used as points in that as well, and because we recognise that the evidence base is very thin in the UK, what we've done is we've spent a of time trying to find an, or some academics to assess the published academic research. [...] and that was to assess any internationally published evidence and bring it together into a briefing that could be used as a point of, here is the gathered known evidence at the moment, and helping to, enabling people to make that case in a slightly more evidence based way, or published evidence based way." (P12)</i></p> <p><i>"So you might have the most wonderful intervention and achieve what you want to do, but if the politicians and the beneficiaries don't want it...So you need to create the situation where everything is aligned. [...] Most of the change is about informing the policy makers to make this change or invest in this area. And there are 2 things you need. One is evidence of the benefit, evidence of the effectiveness of the intervention to achieve that benefit. The other thing you need is support, both from the people who are the beneficiaries and other people who need to support it to strengthen the...you've got to provide the support for policy makers to make the decisions.." (P13)</i></p>
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<p><b>Communication with intent to influence implemented through paths to influence</b></p>	<p>Used for data where participants describe instances where they have thought about or have used the understanding that they have developed from information to influence other people either real, or hypothetical. This involves putting that sense into practice, potentially through a series of different strategies of interacting and communicating the outputs of that sense-making process with other people.</p>	<p>P1, P2, P3, P4, P5, P6, P7, P8, P10, P11, P12, P13, P14</p>	<p><i>"And I think in a way, the presentation was going back a little bit for me, back to basics which I already knew, but which reminded me that not everybody, because I'm in the privileged position of doing this full time and having a lot of the knowledge that, er, [...] my colleague imparted at that meeting already, but it, but actually it was really valuable because not everybody in that room was on the same page, and really kind of understood because people were coming from different perspectives, er, so it was an important pre-requisite...to share that knowledge to get people into the space where then we can have acceptance, and agreement and understanding on why having a policy ask in this area is important." (P4)</i></p> <p><i>"[...] there are interventions that waiting for that perfect evidence provides a barrier to, because we're never going to get that evidence base. Er, an example would be a very popular supported call of a [...] ban on [...], and the common counter argument we get from [...] is we want to see the longitudinal real life study of what influence [...] added to [...]. And we're never going to get that. [...] for prevention policy you have to go in the general direction of where the evidence is pointing to, because...with that particular call [...], we've got so much that</i></p>
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			<i>says, yes, that's the right way to be going but we're never going- we're going to continue to add to the midfield, but we're never going to get that because it's impossible to get that." (P7)</i>
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