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From Brexit to Article 50: Applying Critical Realism to the design and analysis of a longitudinal causal mapping study

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Highlights

- Tracks the national narrative from the Brexit referendum to Article 50
- OR study prioritising researcher creativity through critical realism
- Shows how DREI(C) model can help to conceptualise the process of causal mapping
- Combines qualitative and quantitative OR through a critical realism philosophy

Interfaces with Other Disciplines

From Brexit to Article 50: Applying Critical Realism to the design and analysis of a longitudinal causal mapping study

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Abstract

The UK's journey from the Brexit referendum on 24th June 2016 until activating Article 50 of the Treaty of Lisbon on 29th March 2017 was turbulent. Through applying soft Operational Research (OR) tools within a Critical Realist (CR) philosophy we analyse 86 televised interviews with leading politicians conducted during these nine months, this study uses causal mapping to theorise the changing national narrative. We theorise that, compared to pre-referendum debates, the period was characterised by an inconsistent national narrative where the large volume of information shared did not create a clear message. The study used the philosophy and methodological creativity of CR to justify our development and analysis of causal maps without recourse to interviewees. We apply CR principles of DREI(C) to *describe* (D) the Brexit and data context, explain the causal mapping process and *identify* (I) causal generative mechanisms through a process of *retroduction* (R) to facilitate thematic analysis and develop our theory of the Brexit journey. This combination provides the framework to *eliminate* (E) and identify *corrections* (C) to the emerging theory through iterative abstraction. The contribution to soft OR is threefold. First, it shows how CR can justify a soft OR study where researcher creativity is central, thereby differing from interpretivist causal mapping where respondents are central. Second, it shows how DREI(C) can help conceptualise the process of analysing causal maps. Third, it shows how CR can provide a consistent philosophy for OR studies such as those which use researcher creativity to bridge hard and soft OR.

1. Introduction

On 29th March 2017, the UK Prime Minister (PM), Theresa May, ended nine months of speculation by announcing that she had triggered Article 50 of the Treaty of Lisbon which gives any member-state the right to leave the European Union (EU). This announcement came during a turbulent time in national politics following the Brexit referendum decision on 24th June 2016 to leave the EU. Rarely does one topic dominate a nation for such a prolonged period, but Brexit and Article 50 has fixated onlookers. While Brexit had everything that the soft Operational Research (OR) technique of causal mapping (Eden, 1988) could want in a case study (high complexity; opposing political views; little common ground; little hard data; high stakes) causal mapping was not well positioned to analyse extremely high quality, longitudinal, interview data that was publicly available (Shaw, Smith, & Scully, 2017). The problem lay in the interpretivist methodology of causal mapping which is not

suitable to analyse secondary interview data when there is no recourse to interviewees. To justify the creation and analysis of the causal maps we followed the philosophy of Critical Realism (CR) to treat the interview data as objective.

This is the second paper in a series that analyses causal maps to understand Brexit using qualitatively and quantitatively techniques within a CR methodology. The first paper (Shaw et al., 2017), hereby referred to as 'B1' (Brexit 1), offered initial lessons from analysing causal maps built from longitudinal, secondary data of nine televised debates in the 4 weeks preceding the referendum. This paper, called 'B2' (Brexit 2), starts from where B1 ends by exploring the national narrative after the Brexit referendum result. We develop understanding of CR research enquiry for the causal mapping of nine months of weekly, individual interview, secondary data (Barr, Stimpert, & Huff, 1992; Eden & Ackermann, 2004; Shaw et al., 2017). Causal mapping was selected to facilitate both qualitative content analysis (Axelrod, 1976) to understand the national narrative as well as quantitative analysis of interviews (Eden, 2004) to understand trends.

The data we analyse are from BBC1's Sunday morning programme 'The Andrew Marr Show' which attracts leading UK political figures to provide a news roundup from the past week and set an initial agenda for the week ahead. From this hour-long show, we considered all 101 televised interviews from the period (8.9 hours from 33 programmes - see Appendix) from which we analysed 86 interviews that mentioned Brexit either as the main issue or as one of many.

Of our three aims for this paper, two contribute to understanding what CR offers causal mapping and soft OR research and the third contributes to theoretically explaining the journey from Brexit to Article 50. Aim 1, a 'philosophical' aim, is to continue the work in B1 by explaining the implications on our causal mapping study of following CR. Aim 2, a 'design' aim, is to develop a CR study using causal mapping and explain the influence of the DREI(C) model (Description, Retroduction, Elimination, Identification, Correction) of scientific discovery and development on this design (Bhaskar, 2016). Researcher creativity is evident from applying the analytical methods from B1 to a large volume of longitudinal secondary data that is uncharacteristic of what soft OR would usually accumulate. Aim 3, a 'modelling complexity' aim, is to identify generative mechanisms (e.g. the causal mapping themes) that enable us to theorise the narrative from Brexit to Article 50. The novelty here includes using soft OR techniques to uncover themes that endure and change through the period, and contrasting those to themes from the pre-referendum debates.

The structure of this paper is that we present the philosophical and design considerations for causal mapping in this study. Then we explain the research design and analysis. Findings from applying our analytical methods to the data appear next. We discuss lessons from our work for our three aims and how we learned about CR during and after this study. First, though, we describe the context by

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picking up where B1 ended – the 24th June 2016 and the aftermath of the Counting Officer announcing the referendum result.

2. Describing Brexit to Article 50

The referendum result for the UK to leave the EU was called by the BBC at 4.39am on 24th June. At 6.54am, Philip Hammond, the Foreign Secretary said the Conservative Party government had to "get on with that decision, protecting the economy and doing all we can to get the best outcome for Britain" and that the Prime Minister, David Cameron, "remains the Prime Minister and will carry out the instructions of the British people". At 7.01am, The Bank of England announced it would take "all necessary steps" to ensure monetary and financial stability. At 7.52am, Donald Tusk, President of the European Council announced that the outcome should not provoke "hysterical reactions" and that the EU is ready for Brexit. At 8.08am, within minutes of opening, the FTSE 100 fell over 7%. At 8.23am, the Prime Minister, David Cameron who campaigned to Remain, announced his intention to resign, sparking a Conservative Party leadership election. From then, a new term entered common speech: 'Article 50'.

Article 50 is 256 words in the Treaty of Lisbon that entitles the UK to leave the EU and describes the process for so doing. Article 50 was triggered at 12.20pm on 29th March 2017 when Sir Tim Barrow (Permanent Representative of the UK to the European Union), delivered a letter from the new PM (Theresa May) to Donald Tusk.

What happened between 8.23am on 24th June 2016 and 12.20pm on 29th March 2017 is unlike anything recently witnessed in UK domestic politics (for a journalist's perspective, see (Shipman, 2017)). In the Conservative Party, the resignation of the Prime Minister (David Cameron) led to a chaotic leadership battle during which: one leading contender (Michael Gove - Leave) was accused of politically assassinating another contender (Boris Johnson - Leave) causing reputational damage to both; another contender (Andrea Leadsom - Leave) accused the media of lying over an interview and subsequently withdrew from the contest leaving the eventual winner (Theresa May - Remain) to stand unchallenged.

In the Labour Party – the main opposition party – the impact was also felt. The leader (Jeremy Corbyn) was accused of not supporting the Remain campaign vigorously, signalling a general discontent with his leadership. On 28th June, 172 Labour Members of Parliament (MPs) supported a motion of no-confidence in Mr Corbyn's leadership and called for him to resign (40 MPs did not support the motion). Mr Corbyn declared he would remain in post and up to 3.30pm on 1st July, twenty-one high profile departures from Labour's shadow cabinet and 63 departures in all signalled discontent. A leadership election was triggered, which led to a court case in which MPs tried to block Mr Corbyn from standing, with the eventual outcome of Mr Corbyn being re-elected on 24th

September 2016 with 62% of Labour Party members' votes. Even when Article 50 was activated, Mr Corbyn's future was still doubtful.

Across the UK, 4.1m people signed a petition to "call upon HM Government to implement a rule that if the Remain or Leave vote is less than 60% based on a turnout less than 75% there should be another referendum" signalling public discontent. There were differences in how Brexit took hold in the nations of the United Kingdom. In England – which voted to Leave (Leave 53.4% of the vote; Remain 46.6%) – its interests are not represented separately to the UK meaning there was no separate English narrative on Brexit. In Scotland – which voted to Remain (Leave 38.0%; Remain 62.0%) – Scotland's First Minister visited the EU on 29th June 2016 to "stand up for Scotland's interests" and remain in the EU. Very soon after the Brexit referendum, the governing party in Scotland encouraged debate on a new independence referendum (the last referendum being on 18th September 2014). In Northern Ireland – which voted to Remain (Leave 44.2%; Remain 55.8%) – significant concerns focused on freedom of movement across the border with Ireland and not undoing the progress which created that. In Wales – which voted to Leave (Leave 52.5%; Remain 47.5%) – there was not a strong narrative in the UK media – indeed no leader from the Welsh government appears in our dataset.

Overall, since 24th June many celebrated a brighter future and many mourned with bewilderment at the result. What united both sides was uncertainty over what lay ahead. Statements from the PM such as "Brexit means Brexit" (11th July 2016) and "Red, white and blue Brexit" (6th December 2016) did little answer the enduring question 'What is the plan?'. In October 2016, the PM announced that Article 50 would be activated by the end of March 2017. Court battles ensued on whether Parliament had to vote on triggering Article 50, but this did little to delay matters. On 29th March 2017, the PM invoked Article 50 and the UK formally began leaving the EU.

3. Theoretical context

The theoretical context of the paper first presents our need to move beyond soft OR's reliance on interpretivism and then explains how we operationalized Critical Realism for this study.

3.1 Soft OR's reliance on interpretivism

Seminal works frame soft OR as a new paradigm of OR analysis, compared to traditional quantitative approaches that pursue objective modelling (Rosenhead & Mingers, 2001). Soft OR seeks to model respondents' beliefs about a subjective world (Mingers, 1992), such as how they construct an issue (Eden & Sims, 1979) or perceive a system (Checkland & Scholes, 1990). Soft OR typically adopts an interpretivist view that people construct situations differently so models are subjective, modelling requires respondents to act as participants in the modelling process, and the process aims to build participants' buy-in to modelling outcomes (Gregory, Atkins, Burdon, & Elliott, 2013; Smith & Shaw,

2019). Thus, the interpretivist paradigm of soft OR requires access to participants to understand their social constructions, model their knowledge (Checkland, 1985), and potentially build a model that acts as a boundary object to create a shared language, shared meaning and common interest between participants (Franco, 2013). Soft OR models are validated through collaborative enquiry (Champion & Wilson, 2010) ensuring they accurately represent participants' views. Furthermore, the generalizability of findings from soft OR is limited as there can be no universally applicable claims to truth as knowledge is intertwined with understanding and interaction (Eden & Ackermann, 1996). Therefore, interpretivism is insufficient in situations which lack contact with respondents to build and validate causal maps (Shaw et al., 2017) but Critical Realism can assist.

3.2 Critical Realism

The last thirty years has seen a growing number of CR studies, including discussions of CR as a philosophy looking for a methodology to apply it (Yeung, 1997) addressed, in part, by DREI(C) (Bhaskar, 2016). OR studies that embrace CR often combine a plurality of OR methods (Mingers, 2000) thereby advocating the philosophical value of CR to designing OR research (Mingers & Gill, 1997; White & Taket, 1997). Below, we explain why and how CR is philosophically, theoretically and methodologically useful to soft OR which we contextualise in the qualitative and quantitative analysis of data that has been causally mapped.

The first 'philosophical' use of CR takes soft OR beyond the interpretivist paradigm to analyse social knowledge of objective data (Bryman & Bell, 2015; Fletcher, 2017; Robson, 2002; Tashakkori & Teddlie, 2003). CR regards language from interview data as objective as it actually exists as an artefact of speech, which (Bhaskar, 2016) calls referential detachment. CR differs to other research philosophies by encouraging subjective and objective analyses to be intertwined to identify generative mechanisms (which explain the phenomena under study (Bhaskar, 2016)) contained in data and further differs by declaring that no absolutes exist and that what is known is relative, for example, to context (Archer, Bhaskar, Collier, Lawson, & Norrie, 1998; Johnson & Duberley, 2000; Midgley, 2003). Moreover CR departs from the ontological positivist/constructivist dichotomy by establishing that ontology (nature of reality) cannot be reduced to epistemology (knowledge of reality) (Archer et al., 1998; Bhaskar, 2016; Fletcher, 2017). Bhaskar (2016) thereby challenges the conventional Humean/ Neo-Kantian theory of causal laws that propose ontology can be reduced to epistemology or dismissed. He recognises that experience is a pre-requisite for experimental natural science, and that ontology has primacy over epistemology which, briefly, stems from the importance of experience to access objects of knowledge (Bhaskar, 2016). CR places researcher creativity and self-referential emancipation at the centre of research design and holds that no facts or observations can be separated from the social world (Jessop, 2005; Mingers, Mutch, & Wilcocks,

2013) which is essentially an open social system (Bhaskar, 1975, 1979, 2014). Thus, CR informs the philosophical aim of this paper: to grasp the relationship between the nature of objects (realist ontology) and the social knowledge of them as epistemology (Yeung, 1997).

The second 'theoretical' use of CR involved its principle that the social world is theory laden not theory determined (Fletcher, 2017). To address this, CR offers a broad opportunity for the role of theory in causal mapping studies. Causal mapping originated as a flexible theory that seeks theoretical comparison and modification (Acar, 1983; Jenkins, 1998; Tolman, 1948) and Eden & Ackermann's (1998) variety (an OR method) utilises social construct theory (Kelly, 1955) to represent cognition as causal interactions to build understanding. This starting point for our study prioritises understanding of the impact of social phenomena in context and, like CR, seeks explanation of how the world is differentiated, independently real and stratified (Bhaskar, 2016). CR encourages the researcher to potentially begin with an initial theory from which to create new theories. This aligns with theory building from Eden & Ackermann's (1998) causal mapping which is designed to contribute mid-range theories and establish linkages between theoretical constructs (Jenkins, 1998). Our use of CR involves developing theoretical insight to soft OR (Aims 1 and 2) and inform understanding of the Brexit narrative (Aim 3).

The third 'methodological' use relates to justifying how meaning can be extracted by researchers from our data and the validity of this process. CR validates a researcher driven process and acknowledges that all research is fallible (Yeung, 1997). Thus, the activity of the researcher is of equal value as of those being researched (Fletcher, 2017). CR allows us to view causal maps as an object of reality – resulting from a structured activity (language of interviews) and endorses a mix of descriptive quantitative and interpretive qualitative analyses. Here, the language of interviews becomes an objective reality once spoken (Bhaskar, 2016) that can be examined as a putative object of knowledge. This object can be analysed through a process of retroduction which "involves imagining a model of a [generative] mechanism that, if it were real, would account for the phenomenon in question" (Bhaskar, 2016, p79) which is similar to abduction and pragmatism (Pierce, 1964). Thus, retroduction aims to discover the generative mechanisms contained within data. Mapping interview transcripts and clustering these into themes requires researchers to be active participants who influence findings, a position approved in CR (Bhaskar, 2016) as researchers are active interpreters of objective data. CR researchers respect the objectivity of language and acknowledge the generative mechanisms contained therein (Fletcher, 2017) and advocate holistic and reductive analysis to understand that language. Applying DREI(C) allowed our research process to analyse social phenomena (interviews) to identify generative mechanisms (e.g. themes) from these events (Dobson, 2001; Mingers, 2015; Volkoff, Strong, & Elmes, 2007). Iterative abstraction

(the process of comparing data) advocated by CR to uncover and conceptualise generative mechanisms (Sayer, 1981; Zachariadis, Scott, & Barrett, 2013), identifies the generative mechanism as an object that holds power (e.g. the agency held by a theme), characterised by its attributes and relationships (e.g. themes having traction). The creative process of retroduction enabled two researchers to address the difficulty of achieving interpretive validity (that views of interviewees' are accurately understood) and subsequently modelled. Abstraction from data enabled us to identify generative mechanisms (e.g. content that create the narrative) allowing us to develop causal maps that contain results which are not misrepresentative, on CR's premise that all research is potentially fallible. Hence, CR presents a unique opportunity for soft OR researchers to justify a central role in the research process. How we designed the research process as CR researchers is detailed next.

4. Methodology

Our study involved much learning about CR to conceptualise our design and implementation in CR principles before, during and after the analysis. Our research design was conceptualised as using DREI(C) to apply our analytical techniques to carefully selected data. The design shows how the components of DREI(C) are overlapping, not discrete, and that we oscillate through *description* (D), *retroduction* (R), *identification* (i), *elimination* (E) and *correction* (C) of data and theory throughout the research process. The design creates interpretive validity of the research process by justifying the researcher's influence/agency explained as a feature of an emancipatory process (Yeung, 1997; Bhaskar, 2016). Understanding *description* of the social phenomena began with the researchers living in the context and then as researchers working with the data. Section 4.1 explains the selection of data. Section 4.2 details the role of researcher creativity in designing the analytical approached to *identify* the generative mechanisms proposed in our findings. To iterate as part of *retroduction* we selected a thematic approach (Miles & Huberman, 1994) involving a process of coding and iterative abstraction which led us to *identify* generative mechanisms of our social phenomena. Capturing phenomena is imperfect, however, in CR validity is increased through *describing* context, analysing data using various methods, and constant reflection to reconstructed generative mechanisms and their properties (Healy & Perry, 2000). Thus, we designed four stages of analysis to *identify* distinctions between themes and sub-themes (Fletcher, 2017) that *describe* the data. Section 4.2 explains how we *eliminated* data at different points throughout the process and made *corrections* to analytical techniques and findings to arrive at our theory.

4.1 Selection of data

The characteristics of our dataset aligns with CR on the principle of interacting open social systems over time and context (Bhaskar, 1975, 2016). We start by describing the criteria for data selection. To track the narrative from Brexit to Article 50 we identified four criteria to satisfy for the causal

mapping study to be credible. First, information had to be available that could be analysed using causal mapping. Second, the data needed to relate to Brexit's political fluctuations of the day, to track if/how the national narrative changed over time. Third, we aimed for the data to have political balance across interviewees as this was the widest narrative the public received, so had to include a variety of senior politicians across the political spectrum who could establish different narratives. Fourth, to ensure availability to a wide audience, the communication had to be easily available to the nation to influence the narrative.

Based on these criteria we selected as the sole source of data 'The Andrew Marr Show' which is arguably the UK's foremost weekly political magazine television programme, broadcast on BBC1 on Sunday morning. The 60 minute programme achieves balance by having 3-4 interviews (averaging 9.5 minutes) with at least one UK cabinet-level minister and one opposition cabinet-level politician. The first programme in our dataset (see Appendix) was broadcast on the 26/06/16 (the Sunday after the Brexit referendum result) with our final programme being broadcast on 26/03/17 (the Sunday after Article 50 was initiated). Our data covers nine months of programmes (33 shows) including a two week break for Christmas and a five week break during parliament's summer recess. Data was only collected when the interviewee spoke about Brexit, thus we excluded 19 interviews from a total of 101 interviews because Brexit was not mentioned. On 4 occasions two people were interviewed simultaneously so, for comparability, each persons' interview was analysed separately. Some interviewees appeared on several programmes and these were analysed separately. When only part of the interview discussed Brexit, that section was analysed and the rest of the interview excluded. In all, we built 86 causal maps – one for each interview in our dataset (see Appendix).

4.2 Analysing through causal mapping

To aid readability of this section, Figure 1 shows the relationship between the different types of themes that have been coded. Figure 1 shows verbatim contributions from Jeremy Corbyn and Theresa May and how they were coded to 'interview themes', 'campaign sub-themes' within the 'campaign theme' of *Immigration*. Figure 1 is for illustration and the full maps show more contributions from a greater number of participants.
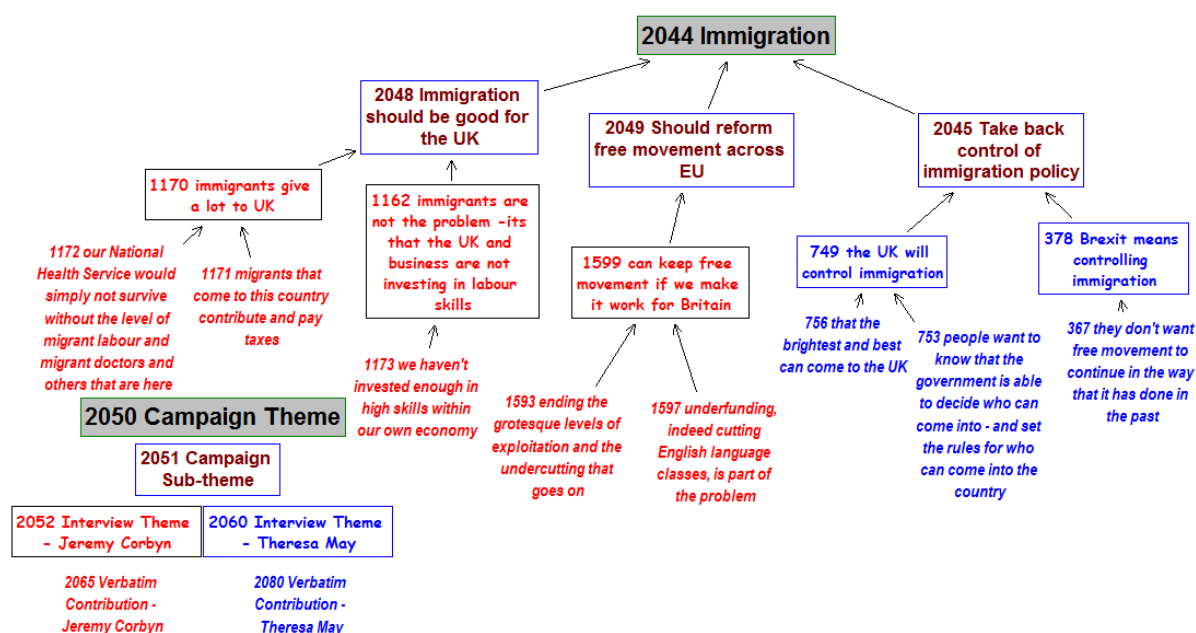
Figure 1: Causal map of immigration (coded from interviews with Theresa May and Jeremy Corbyn)

Our analytical approach refined that used in B1. To build an interview map, first, a verbatim transcript of the interview (the only form of data) was read to understand the content of the interview and whether it qualified for inclusion. To mark up the transcript, issues were *identified* as contributions to be mapped. For consistency, both researchers individually marked up the same five transcripts and then compared results to align styles. Then 50% of the remaining transcripts were marked up by the first researcher and, for confirmability (Guba & Lincoln, 1989), validated by the second researcher to identify and jointly *correct* inconsistencies. The second researcher then marked up the remaining transcripts to be validated by the other researcher.

To map the transcript, marked up contributions were transferred verbatim onto a causal map computer model (using Decision Explorer software), ensuring the maps were based on an objective representation of issues. Each contribution was recorded as a separate concept on the map, with causal relationships between concepts being coded as an arrow link – taking an iterative process of retroduction working between the data and the map to build a justifiable representation. The computer model helped by representing the maps and moving concepts easily. Within individual maps similar concepts were open coded into 'interview themes' (called 'debate themes' in B1 and Table 1) – again done iteratively using an inductive approach so open codes emerged from the data (Miles & Huberman, 1994). The mapped issues were scrutinised by the other researcher to *correct* errors in: the consistency of relationships between concepts; the grouping of concepts into open codes; the label for each theme.

To identify axial codes across interview maps (Strauss & Corbin 1998), all 415 interview themes were extracted and two researchers independently coded half into 'campaign themes' through a process of *identification*, *elimination* and *correction* by constant comparison between interview maps, interview themes, and campaign themes. Independent coding allowed for divergent *identification* of axial codes leading to a richer understanding of the data and eventual *elimination* and *correction* onto 15 emerging campaign themes. Normally an interview theme was coded into a single campaign theme, but some sat between two campaign themes (e.g. *Trade-off between free movement and the economy*), so were coded in both (e.g. *Economy* and *Immigration*). This process adapted Strauss & Corbin's (1998) coding framework to identify the deeper level of axial codes which, for CR, refines the coding process to show the distinction between the descriptive (marked up transcripts) and analytical (mapped themes). As campaign themes were described in several ways by interview themes similar interview themes were clustered within a campaign theme to create campaign sub-themes. Each researcher themed half the interview themes into campaign sub-themes. They then jointly *corrected* differences to finalise the campaign sub-themes and campaign themes. A final process involved a third researcher who audited the DREI(C) process followed and proposed *corrections* to the marking up and mapping of transcripts and the clustering of interview themes into campaign sub-themes and campaign themes.

This research process reflects CR's conceptual journey of *retroduction*, and in shifting from descriptive to analytical properties to explain generative mechanisms through iterative abstraction (Mingers et al., 2013). Retroduction applied to our longitudinal data denotes a process of analysing socially constructed human activity enabling the researcher to create insight to underlying generative mechanisms (themes) (Archer et al., 1998). Taking a DREI(C) approach to combining Miles & Huberman's (1998) thematic coding and Strauss & Corbin's (2000) axial coding offered a framework to analyse coded language through a retroductive process (Robson, 2002). This aligns to CR's identification of generative mechanisms as the coding is iterative and abstracts from open codes (interview themes) to axial codes (campaign-sub and campaign themes) (Bryman & Bell, 2015). Applying DREI(C) to data to produce knowledge exemplifies researching at the transitive domain which, for CR, is the social world where knowledge is generated through human agency (Fletcher, 2017). Bhaskar (2016) suggests there are three interacting levels of the 'transitive' domains of reality: *real*, *actual* and *empirical* each with implications for our research process. The *empirical* domain is closest to the actual data, for example, where we marked up the language in transcripts. The *real* transitive domain includes structures (language) that indicate themes (individual, campaign sub, campaign) that form generative mechanisms (such as the power of language) which, once triggered through *actual* events (e.g. interviews), expose influences that are

empirically observed and experienced (Bhaskar, 1976; Zachariadis et al., 2013). The *actual* domain is where events happen regardless of whether or not they are observed (Fletcher, 2017) e.g. the televised interview where expression adds meaning to language, which exists for our data but was not analysed. CR also proposes that a reality exists independently of our knowledge – termed the 'intransitive domain', and together these interacting levels of reality help us understand why the researchers' knowledge is fallible, albeit not equally fallible (Bhaskar, 2014).

The concepts and themes were dissected through four stages of analysis. Stage 1 analysed how much information interviewees presented and how detailed were their narratives, initially differentiating by: time i.e. as interviewees came to understand the Brexit challenge; political affiliation; which side they supported in the referendum campaign. These comparisons were *eliminated* as they did not identify interesting results when comparing descriptive statistics e.g. number of concepts, links and themes covered. However, we identified notable differences between the amount of information communicated in short interviews (B2) and in longer debates (B1) so analysis focused on this comparison.

Stage 2 focused on how B2 changed the narrative from B1 and the comparative productivity of B2 and B1 interviewees in achieving this through campaign themes.

Stage 3 analysed the breadth and consistency of campaign themes through the campaign sub-themes that describe different aspects. Breadth appeared as different views being raised with little coherent argument, or as a well-considered, wide-reaching argument. Thus, we analysed the number of campaign sub-themes per campaign theme to uncover the variety provided by interviewees (Danermark, Ekstrom, & Jakobsen, 2001). On consistency, we compared arguments by developing a consistency score adapted from B1 where we summed the square of how many interview themes made up the campaign sub-themes within a campaign theme. To enable comparison with B1, this score was divided by the total number of interviews (given the larger B2 dataset). We then analysed consistency longitudinally using an amended coding scheme from B1 to identify whether campaign themes provided a message that is not consistent (Types 1-4), somewhat consistent (Type 5) or very consistent (Type 7) - explained in Table 3.

Stage 4 identified interviewees' tactics for building campaign themes. The tactics reach across our analysis and help *describe* how the national narrative was formed. We present Stage 4 analysis before Stages 1-3 to *describe* insights from the interviews, thereby showing the *retroductive* process.

Each of these four stages are informed by DREI(C) to uncover generative mechanisms that created the Brexit narrative. Together using DREI(C), the four stages also build a higher level relational theory to identify an overarching theory on Brexit (Aim 3, as we will discuss).

5. Findings

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We begin with Stage 4 analysis to *describe* the content of interviews through *identifying* the presence of tactics from B1 and new tactics. Then, we provide *descriptive* analyses from Stages 1-3. Findings usually exclude reference to published findings but we compare findings from B2 with those from B1 to give contextual *description* to B2. For example, that B2 interviewees made (on average) 2.78 concepts per minute takes enhanced *description* in the context that they made over 2.9 times as many than individual debaters in B1 (2.78 concepts compared to 0.93/0.97 [1]per minute in B1).

5.1 Stage 4 - Overview of interview tactics

Analysis *identified* 15 campaign themes across the data (left hand column of Table 1). Of these, 10 were campaign themes not in B1 (bold italics) which *describe* a new national narrative, while the remaining 5 themes continued from B1. The volume of data prevents in-depth *description* of each campaign theme so we focus on B1's five tactics to *describe* their use in B2 and *identify* a sixth tactic of 'deferring'.

On creating traction, interviewees created a new national narrative immediately after the referendum result when traction was lost on B1's campaign themes such as *Impact of immigration* and *The EU is failing the UK*. Traction was established on new campaign themes such as *Politicking* (appeared in 29 of the first 33 interviews) which contained campaign sub-themes such as: *Optimistic rhetoric about Brexit* (18)[2] and *Negative rhetoric about Brexit* (6). Remain politicians created traction that they accepted the result of the referendum, while Leave politicians built traction on others not moving quickly enough on Brexit.

Diversion is when debaters shift discussion onto areas where they could generate traction. In B2, interviewees diverted by ignoring uncomfortable questions, but initially there were no areas of comfort for most interviewees because the situation lacked party direction.

B2 Campaign theme (ordered by # interview themes)	B1 Campaign themes shared between Leave and Remain (ordered by # debate themes)
Politicking (consisting of 79 interview themes)	Impact of immigration (consisting of 37 debate themes)
Negotiating the best deal (66)	Trade deals (24)
UK trade relationships (42)	Whose opinion to trust (22)
Accept the will of the British people (38)	Impact on public services (19)
Immigration (36)	Changes in quality of life (14)
Economy (29)	Impact on jobs (13)
Voting on final deal (29)	Law making (11)
Countries in the UK issues (26)	Changes in security by leaving (9)

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[1] When *describing* B1's results we provide the two results – the first for Leave and the second for Remain, separated by '/'.

[2] Numbers in brackets show the number of times that theme was coded across all interviews during the Article 50 period.

	B1 Campaign themes unique to Leave (ordered by # debate themes)	B1 Campaign themes unique to Remain (ordered by # debate themes)
What happened in the EU referendum (19)	The UK's sovereignty (5)	
UK post Brexit relationship with EU (16)	Protection of workers' rights (4)	
Article 50 (16)	Impact on border control (2)	
Protections and laws (12)		
Don't know what leaving the EU means (9)	EU is failing the UK (15)	Economic impact of leaving (15)
The EU institution failing Britain (8)	Our money sent to the EU which we have no control over (15)	New deal / EU reform is good for UK (12)
Potential of a general election (7)	UK is strong enough to be successful (12)	The EU is not that bad (9)
	Insignificance of the UK in EU decisions (4)	Isolation of the UK (9)
		The big risk of leaving (8)
		Some of the issues that are blamed on the EU are not its fault (6)
		Benefits of free movement (5)
		Second Scottish referendum likely if we leave (2)
		Leave do not have a plan if they win (2)

*Table 1: Identifying B2's new campaign themes (in **bold italics**) and those that continue from B1*

In B1, debaters often took opposing positions to "obfuscate the strength of opposition's message." ((Shaw et al., 2017p1027)). In B2 it was difficult to obfuscate the opposing argument for nine months. Where opposing narratives were evident, often one had traction but traction could change sides. For example, a shift was evident in the campaign theme *Voting on the final deal.* On one side the perspective was that *Parliament should have a vote on the final deal* – with the opposition that *Parliament should be involved throughout process* so a vote was unnecessary. This appeared in interviews 25-45 when the pro-vote was coded in 3 interviews and the anti-vote in 9 interviews. The issue subsided then returned in the final 20 interviews when the pro-vote dominated (coded in 7 interviews, compared to 2 for anti-vote).

B2 had less consistent messages than B1, potentially for two reasons. First, the longer period of B2 allowed issues to wax and wane. For example, in the first 39 interviews the campaign theme *Article 50* focused on the timeline for triggering – but this lost traction after timelines were announced. It regained traction when the proposed legislation was formally challenged. Second, a larger number of interviewees (56 individuals compared to 16 in B1) brought more personalities and perspectives across which to identify consistency.

The public's emotion on Brexit was exploited in B2, albeit less than in B1. Emotion was mostly used in themes continued from B1 (for example, *Immigration*) and when attacking the government (for example, *Guarantee rights of EU citizens living in the UK*). An emotive campaign theme unique to B2 was *Don't know what leaving the EU means* (9) which established traction. Interviewees softened on emotive issues from B1 (e.g. *Predictions about negative economic impact of Brexit wrong* was coded in only 3 interviews) and were more positive (e.g. *Negative rhetoric about Brexit* was coded in 5 interviews, while *Positive rhetoric about Brexit* was coded in 14 interviews).

We *identified* a new tactic from B2 data, deferring. Interviewees moved away from some controversial issues claiming they were acting in accordance with external influences. Most former Remain campaigners deferred to the electorate and said they *Accept the referendum result* (18). Another example is *Cannot give running commentary on Brexit as it will weaken our negotiation position* (7) deferring to external influences that would benefit.

5.2 Stages 1-3 Analysis of maps

We *identify* the main contrasts between B2 and B1 findings in Table 2 to enhance this section's readability.

	B2	B1
Stage 1	Made more detailed maps, contributed more concepts to themes (per minute) and covered more B1 individual themes.	Contributed more information in each debate than B2 interviewees because of their longer duration.
Stage 2	The dominant narrative significantly changed from B1 – towards new, more positive, campaign themes. Interviewees covered more campaign themes in the equivalent time.	Used the longer duration to, in each debate: cover more campaign themes; contribute to a greater proportion of campaign themes; create more campaign themes.
Stage 3	Developed campaign themes that did not have a highly consistent message but had more breadth from more campaign sub-themes.	Leave's campaign themes were more consistent than B2, but Remain's were less consistent. Both had less breadth from less campaign sub-themes.
Stage 4: Debate tactics	A much less consistent message was presented than in B1, as interviewees established a new national narrative. Emotion was exploited to establish traction, however mostly in campaign themes carried from B1. It was harder to divert from the oppositions' key messages.	Leave established more consistent messages and were able to divert conversation from strengths of the Remain campaign. Both campaigns exploited emotive topics to build traction.

Table 2 – Identification of results

The average length of a B2 interview was shorter than a B1 debate (8.9 minutes compared to 77.5/75 minutes) but the summed duration of interviews for B2 (534 minutes) was similar to B1 (465/525 minutes) – but over more instances in B1 (86 interviews) than B2 (6/7 debates).

From Stage 1, interview maps from B2 interviewees had more information than B1 in the equivalent period, as B2 interviewees contributed more concepts (1483 concepts) and links (1715 links) than B1

(338/414 concepts and 469/614 links). Adjusting for the shorter length, B2 interviewees gave more new information per minute (2.8 concepts, 3.2 links, 1.2 ratio of proportion of links per concept) than B1's individual debaters (0.9/1.0 concepts; 1.3/1.4 links; 1.4/1.5 ratio) and group debaters (0.6/0.7 concepts; 0.9/1.0 links; 1.4/1.5 ratio). B2 interviewees also built themes that were more described i.e. contained more concepts (average 3.5) than B1 (3.1/2.4).

Finally, B2 interviewees used their equivalent time to cover more individual themes than B1. B2 contributed more interview themes (418 themes) compared to B1 (139/135) and, adjusting for length, B2 interviewees contributed more individual themes per minute (0.8 themes) than B2 (0.3/0.3). The additional contributions per minute from B2 added new detail – more than for B1 which had more duplication. Overall, B2 interviewees contributed more new information than B1 in an equivalent period.

From Stage 2, B2 campaign themes changed the narrative from B1. B2 had a similar number of campaign themes (15) as B1 (15/20), but different content. From Table 1, 5 campaign themes continued from B1 (preserving the pre-referendum narrative) and 10 B2 campaign themes established a new narrative. Overall, the B2 narrative was dominated by new, positive themes.

On the volume of contributions, adjusting for the shorter length of B2 interviews shows the productivity of interviewees, for example, they populated a campaign theme to which they had not before contributed every 1.8 minutes, higher than B1 (every 7.5/5.5 minutes). Also, B2 formed campaign themes with, on average, more concepts (98.9) and interview themes (27.9) than B1 (56.3/59.1 concepts and 9.3/6.6 debate themes). So, equivalently B2 interviewees covered a greater number of different campaign themes and described those more fully than B1.

From Stage 3, the campaign sub-themes developed longitudinally in B2 were not as consistent as B1's but created more breadth. The breadth score is the number of campaign sub-themes in a campaign theme – which was similar for B2 (8 themes) and B1 (11/7). Other results show that B2 offered more breadth in each campaign theme (average 4.7 campaign sub-themes per campaign theme) than B1 (4.1/3.3). The consistency score assesses the extent to which campaign sub-themes are repeatedly discussed across debates, but the larger number of B2 interviews made it difficult to calculate using B1's method. Adjusting for the number of interviews, B2 and B1 have similar results as more campaign sub-themes in a campaign theme, showed that the additional campaign sub-themes contribute deeper (not only broadening) content. From B1, a score of 20.0 distinguished consistent and inconsistent themes – which, adjusted for the number of debates, is 3.3/2.9 campaign sub-themes. Averaging gives an adjusted consistency score of 3.1, which reproduces B1 findings for the Leave sub-themes (10 consistent/5 inconsistent) and Remain (5/15) – and shows the inconsistency of B2 interviewees (6/9).

Campaign theme provides …	Type of campaign theme	% of B2 campaign themes (out of 15 campaign themes)
… no consistent message across debates.	1. Orphan.	0.0% (0 campaign themes)
	2. Starts but then fizzles out.	20.0% (3)
	3. Didn't realise it was an issue, then had to respond.	0.0% (0)
	4. Multiple campaign sub-themes with no consistent message running through the debates.	53.3% (8)
…a somewhat consistent message across debates.	5. Single campaign sub-themes running through the debates (with other interview themes providing support).	26.7% (4)
… very consistent messages across debates.	6. Multiple campaign sub-themes running through the debates (with other interview themes providing added support).	0.0% (0)

Table 3: Consistency score for campaign themes (based on Shaw et al (2017))

Results in Table 3 *identify* an inconsistent B2 narrative but the rigidity of applying the six types in B1 could not be replicated in B2 due to the large number of interviews. Instead, a *correction* to the approach was made to write vignettes for the 33 weeks on how each campaign theme was formed across weekly programmes. For example, the *Article 50* campaign theme vignette was: "Mentioned once in first 3 programmes, then in 5 of next 7 programmes – lots of focus. Then mentioned only in 2 of next 14 programmes, before mentioned 5 of next 7 programmes, and then not mentioned in last two programmes. Interview themes are very sporadic. Mentioned in 17.4% of interviews which is low –joint 8th out of 15 campaign themes in B2. Overall, Type 4". The vignettes show that 11 of 15 B2 campaign themes *identify* narratives of low consistency (73.3% in Types 1-4 in Table 3), more than B1 (33.3%/65.0%) – and formed a similar proportion (26.7%) of 'somewhat consistent message' campaign themes as B1 (25.0%/26.7%). No B2 campaign themes formed a 'very consistent message', unlike B1 (40.0%/10.0%).

In sum, B2 lacked a consistent national narrative.

6. Discussion

The three aims of this paper are discussed below. Our philosophical Aim 1 considers how CR offered a philosophical framework for this study and how this protected from issues of incommensurability. Next, our design Aim 2 shows that while CR provided a philosophical framework it didn't provide the analytical tools to fully analyse the data so we utilised analytical tools from OR. We discuss the relationship between those OR tools and how they were exploited within a CR framework. Finally, our modelling complexity Aim 3 identifies how we reconceptualised our findings relating to the context and national narrative to create a theory on Brexit to Article 50. Finally, we offer reflections and critique of both CR and our use of CR in action.

Aim 1 shows how CR offered a philosophical paradigm, through CR in action, under which to conduct the research. OR has long considered issues of mixing approaches from different philosophical backgrounds (Flood, 1989; Jackson, 1987). "Mixing methodologies arbitrarily becomes bogged down in incommensurabilities, inconsistencies and incoherence" (Schwaninger, 2004 p412) rendering the philosophy of the resulting approach unclear. These inconsistencies lead to paradigm incommensurability when mixing approaches lead to mixing different paradigms that cannot be reconciled (Jackson, 2003) rendering a barrier to mixing approaches at a philosophical level (Kotiadis & Mingers, 2014).

While several approaches to overcome issues related to paradigm incommensurability have been proposed within OR (see Bennett's Linkage Framework (Bennett, 1985; Ormerod, 1995) and Total Systems Intervention (Flood & Jackson, 1991)) we embrace the flexibility of CR and through researcher creativity to develop an approach under a single philosophical frame. Here it is not necessary to accept that a technique or method is wholly internal to a single paradigm (Mingers & Brocklesby, 1997; Smaling, 1994) as "it is quite possible to disconnect a particular method from its normal paradigm and use it, consciously and critically, within another setting" (Mingers, 1997 p.14). Therefore, when using methods we did not accept their philosophical basis, for example, when causal mapping we did not pursue the joint understanding, reflection, negotiation of strategy suggested by Journey Making (Eden & Ackermann, 1998). Instead, we used the identification of text and the connection of related text by arrows into thematic clusters (as advocated by Eden & Ackermann (1998)) but this was understood through CR and, in particular, DREI(C) as the mindset through which we clustered mapped data into themes. At the time of the study we knew we were treating causal mapping as a smart bit (Shaw & Blundell, 2010) by representing information using its general approach but not exploiting the philosophy of the method.

To illustrate how CR empowered us to combine approaches from different philosophical positions within this study we had a philosophical challenge to grasp the relationship between the nature of objects (realist ontology) and the social knowledge of them as epistemology (Yeung, 1997). CR's approach to analysing objective data is mixed-methods but of a flavour that is different to mainstream mixed-methods approaches (Creswell, 2003; Tashakkori & Teddlie, 1998) which tend to use positivist and interpretivist methodology in complementary phases. Unlike quantitative causal modelling (e.g. econometrics), encouraging descriptive quantitative analysis is an applied feature of DREI(C) on the basis that "correlations between variables alone cannot uncover evidence on the generative mechanisms that generate the actual events we observe or predict future incidents" (Zachariadis, Scott, & Barrett, 2013, p10). Thus, the focus of our analysis is on uncovering a variety of descriptive truths to identify of there is an overwhelmingly consistent message contained in the data

and applying multiple analytical approaches to triangulate the existence of those messages to overcome the uncertainty associated with any single finding.

Therefore the approach we present avoids questions about paradigm incommensurability as no paradigms were mixed. Instead we developed a new approach under a consistent philosophical frame of CR. After detaching methods from their historic paradigm we used them together in a new configuration under CR being guided by the DREI(C) framework and embracing the researchers' creativity and power.

CR in action ("the soul or heartbeat of critical realism" (Bhaskar, 2016, p78)) provided a philosophical framework to govern how we collected and analysed data however, as a philosophy, it did not explicitly provide operational tools to complete either activity. The collection of data was straightforward once a credible source had been identified. The analysis of data was more difficult and so, for that, we looked to OR methods for how to analyse qualitative and quantitative data. Aim 2 considers how we arranged these OR techniques within a CR philosophy. We began with causal mapping to understand the interview data and the results produce by this method were analysed using simple descriptive statistical analysis to compare B2 and B1. Initially we were not as aware of what was needed to apply causal mapping within CR, indeed much of that has been learned iteratively with a focus of theorising practice using CR principles after the stages of analysis had taken place. Through that process we achieved greater alignment with CR and more fully understood the limitations of causal mapping and the merits of CR in overcoming those limitations. This process of development was possible through using causal mapping as a smart bit (Shaw & Blundell, 2010), and working as under labourers (Bhaskar, 2016) to follow 'CR in Action' as our guiding philosophy. An example of what this meant in practice is that we understood more about the creative agency and the power of our researcher role as constitutive of knowledge producers (Mingers & Gill, 1997) and emphasised validity measures to mediate that and increase confidence in how that power was controlled and dissipated across the research team.

This study contributes to OR by detailing a CR approach to longitudinal causal mapping that is informed by a CR philosophical lens which influences the researcher to be the creative custodian of 'CR in Action' (Bhaskar, 2016). For the research process this means there is not a prescribed set of procedures to be followed to implement CR – so there is no CR equivalent to the tried and tested qualitative tools of interpretivism. Rather OR researchers are empowered so that other studies beyond causal mapping can utilise CR's DREI(C) in alternative, creative ways and potentially draw on the researchers' creativity in their endeavour (Mingers & Gill, 1997). However, this does not mean that researcher creativity is without rigour or validation and we discuss these issues below in how we managed the CR research process. Our approach prior to incorporating CR, and the application of

the DREI(C) model, was not in isolation to initially selecting two tried and tested parts of methodologies common to causal mapping and interpretivist research, namely thematic analysis (Miles & Huberman, 1994) and inductive coding analysis (Strauss & Corbin, 1998). We acknowledge that from the offset we were in a comfortable expertise rut which was constrained by our knowledge of interpretivism. Later we understood Mingers & Gill's (1997) point that the complexity of all problem situations means that parts or all of different methodologies can be used in the research process. CR allowed us to simultaneously select methods associated with interpretivism and mitigate the dilemmas we faced concerning interpretivism which we knew to be inappropriate for our causal mapping study given our lack of contact with interviewees (Shaw et al, 2017). Data had to be treated as objective so maps were vehicles to understand objective data CR and legitimised the researchers' creativity and influential role (and their influence in the subsequent fallibility of all research). This creativity enabled us to go beyond what we would normally achieve in soft OR studies, for example, by building maps without recourse to the interviewees and by statistically analysing the generated themes to contribute those that were emerging. Thus, we harnessed this elevated researcher creativity and power as the essence of our research process without which this study would not have been possible.

In CR the creative role of the researcher is central which justifies how meaning can be extracted by researchers from the data in a research process. Mapping issues from interview transcripts to form issues and then clustering them into themes required the researchers to be active participants who influence the research process. This creates a tension between the need to treat the transcribed data as objective while acknowledging that researchers were the only active interpreters of that objective data source. In our study the process of identifying the nature of influences from the data is the essence of our longitudinal comparative findings – for example, the campaign themes that form an inconsistent narrative over the period can be compared to those that create a consistent narrative across the period of B1 (in Table 1). Also relevant here is that CR proposes that the existing social structures being analysed are constantly changing by human agency (Archer et al., 1998). This involves a constant process of 'structuration' between the structure (e.g. language of interviews) and agency (e.g. influence from researchers in analysing that language) (Archer et al., 1998). This differs from (Giddens, 1984) 'structuration' debate whereby, in CR, social phenomenon hold ontological primacy e.g. generative mechanisms (such as themes) have objective characteristics that can be investigated to understand the social meaning they transmit (Mingers, 2015). As researchers who seek to understand the transitive domain we provide agency by which interview themes could be explained through interpretation of objective data. These themes provide interpretive

understanding of the social world that are researchable through the processes of our analytical techniques (qualitative causal mapping, open and axial coding, descriptive quantitative methods).

Retroduction aligns well with our longitudinal data to denote a process of socially constructed human activity that enables the researcher to create explanation that provides insight to underlying mechanisms over time (Archer et al., 1998; Johnson & Duberley, 2000). Capturing this reality is imperfect, however, validity in CR in action is increased through describing context, analysing data using various methods, and constant reflection to reconstructed generative mechanisms and their properties (Healy & Perry, 2000), a process exemplified in the DREI(C) model (Bhaskar, 2016).

On Aim 2, the design aim, to operationalise CR in longitudinal analysis we analysed for the presence of generative mechanisms and used iterative abstraction to build persuasive explanations of their presence and interpretive validity (that views of interviewees are accurately understood) (Zachariadis et al, 2013; Bhaskar, 2014). Having two coders aimed to avoid a reliance on one who may have misunderstood the observable social phenomena (interviews) to incorrectly identify generative mechanisms (aspects of themes) (Dobson, 2001; Mingers, 2015; Volkoff et al., 2007). Collaborative iterative abstraction (the process of comparing data by coders) from the data enabled the researchers to identify and conceptualise generative mechanisms (e.g. aspects of themes that create impact such as sub-themes which have influence) (Sayer, 1981; Zachariadis et al., 2013) as objects that holds power (e.g. the influence/agency held by a theme), characterised by its attributes and relationships (e.g. how a themes establishes traction or stirs emotion).

The constant comparison of findings to B1 is important in providing opportunity for iterative abstraction and contextualising the results to show the alignment or uniqueness of results within a similar historical context. Thus, our research adopts the CR principle that social structures are historically and contextually specific (Danermark et al., 2001) so, as agents, we can justify comparing the shifts in narrative of B1 and B2 through retroduction. This provides enhanced meaning to B2 results as, without constant comparison to B1, our results would be less insightful. Also for B2, language, in this case the secondary data interviews, is viewed as a structural property which can be analysed descriptively because the purpose is to gain understanding, not to establish observable facts through scientific rigour, which is impossible given CR's principle that all knowledge is fallible. As such, the inferences discovered from analysing causal maps allows us theoretically to integrate the inferences of the meaning of phenomena that exhibits this wider social reality. To do this, CR's retroduction advocates using different research tools (Mingers, 2001) to uncover variety to understand the generative mechanism (theme) from empirical experiences (language) and actual events (interviews) (Johnson & Duberley, 2000). Hence, our qualitative longitudinal analysis of casual mapping exemplifies iterative abstraction to analyse structured activities of social reality (language

of interviews). In this sense the underlying mechanisms inform the inferences of consistency, which are conditional on the amount of data available – relating to the previous discussion which identifies how structure and agency should not be conflated (Bhaskar, 2016). Hence, in our study the types of analysis conducted (individually and together) and various findings they provide suggest an inconsistent national narrative – a theory in which we can have more confidence based on the context, triangulation of different analyses, and are best understood through comparison to B1.

Thus we demonstrate rigour of analysing data from respondents (as in interpretivism) but by combining different types of analysis (tactics, qualitative themes and descriptive statistics) to achieve saturation in understanding the national narrative from across these analysis. To conduct the analyses we needed a framework which respected the objectivity of the language used, the generative mechanisms they contain, and the potential of holistic and reductive analysis applied to that language.

Overall, CR offers OR a philosophy aligned to an applied application of 'critical realism in action' (Bhaskar, 2016, p78) through DREI(C) that informs an alternative to interpretivism (associated with soft OR) and positivism (associated with hard OR), and justifies the validity and the research process by combining a range of qualitative and descriptive quantitative analytical techniques applied to social reality.

On Aim 3, modelling complexity, our theory that emerged from the analyses of findings is that there was an inconsistent narrative from Brexit to Article 50. The dominant themes have been stated in the analysis as have the presence of tactics through which those themes became dominant. However, that there was no consistent national narrative could result from interviewees harbouring their Leave/Remain and political party affiliations. Thus, instead of tackling emotive issues based on emotive personal narrative as in B1, interviewees reverted to political party distinctions but the political parties had no dominant narrative initially visible, perhaps because of the surprise of the result. So, while political parties developed their position, interviewees perhaps had little party steer to guide their personal narrative which meant analysing by parties returned little insights. The exception was the Scottish National Party (SNP) who only offered one interviewee who was interviewed four times in the nine months and who had a consistent narrative dominated by three issues: Scotland did not vote for Brexit; Scotland is preparing options to protect Scotland's interests, including being involved in the Brexit process; and, independence for Scotland would allow Scotland to Remain so a independence referendum is to be considered.

6.2 Reflecting on Critical Realism

Despite its appropriateness for this study, CR is not without critique. Below, we comment on issues we faced when using CR, beginning with the difficulty of the philosophical interpretation that informs the 'critical realism in action' design. The philosophy of CR can invoke different interpretations as it is sometimes difficult to decipher. This point is not new as Yeung (1997) argues that CR is a philosophy in search of methodology and making CR more accessible in practice to avoid ambiguity over its philosophical concepts has been pervasive in CR (Fleetwood, 2004). Bhaskar (2016) enables a more accessible understanding, and whilst B1 argued the case for CR, in B2 (Bhaskar, 2016) shows us the importance of how DREI(C) enables researchers to operationalize the principles of CR in action. Previous CR studies have embraced researcher creativity when designing the research process and have understood how CR application in practice are inextricably linked to CR philosophy (Patomaki & Wight, 2000).

In this paper the process of iterative abstraction has been explained at practical and philosophical levels. However, the researchers are mindful that this process could result in alternative findings if different researchers conducted this process. This is because of CR's acknowledgement that researchers bring tacit knowledge to understand the objective world and, subsequently, researchers do not know everything they use to analyse data (Polanyi, 1958). It is possible that their agency mixed with their contextual history brings subconscious influences on their view of the data and the findings – thus why all research is fallible, but not equally so.

Lastly, while CR seeks emancipatory research, according to Sayer (1997) there is little evidence of CR being able to deliver the normative aspects this would imply – for example, the researchers flawed knowledge can lead to ethical reflections. This normative issue of responsibility is central because of the human agency of researchers and the 'ethicality' (Mingers & Gill, 1997, p436) of the application of CR in action. On the basis of our selection of analysing secondary publicly available data we argue that, ethically, we have done no harm to our respondents (Bryman & Bell, 2015). However, we take responsibility for the process of our value judgements during iterative abstraction in terms of what our findings imply as they are, themselves, now generative mechanisms to be interpreted in the current and future climates which add to the historically contextually specific context which has impact (Danermark et al., 2001).

7. Conclusion

We had three aims for this study which sought to stress-test and further appreciate the application of CR to causal mapping to theorise the Brexit to Article 50 national narrative. The value of the study centres on a more thoughtful exploration of how causal mapping for qualitative, longitudinal analysis of publically available data fits philosophically and methodologically with Critical Realism.

This means recognising the conditional limitations when thinking philosophically about why we cannot understand all phenomenon of the social world, as well as considering how and why we can ask questions about what is the social world of phenomenon like if it exists objectively. It also means thinking of the conditional limitations when asking how, and in what ways, can OR methods offer us limited understanding. It is essential to think about methods in terms of how do we investigate a social world which is independent from our consciousness, and whose knowledge counts and why, while accepting that knowledge is flawed. CR accommodated our focus on real world issues (Mingers et al., 2013) whilst providing the philosophical and methodological underpinning to enable validity and rigour in our research design (Zachariadis et al., 2013). CR offered us an application to harness researcher creativity to explore how social phenomenon manifest. This paper contributes to OR by exploring how CR can underpin a causal mapping research project and lays a new basis for theoretically principled OR causal mapping analysis on longitudinal secondary data.

Unlike B1, we did not have as an aim to deliver a teaching case although, arguably, we have done so (Hindle, 2011). Using publicly available data, the individual interviews from the 'The Andrew Marr Show' can be provided to 86 (groups of) students in a classroom environment – each of them having one unique part of the national narrative that was built during nine months. As discussed more fully in Shaw et al (2017), the same themes from Table 1 should emerge if analysis is replicated by a student group. Indeed, Brexit interviews on 'The Andrew Marr Show' continue at the time of submission to EJOR, meaning that even more students can have unique data on the new narrative that is being built as deals are being discussed for the UK's withdrawal from the European Union.

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Appendix: The interview data

Interviewee	Job title when they appeared on the programme	Date of interview	Sequence in show	Duration of Brexit interview (minutes.seconds)

Nicola Sturgeon	First Minister of Scotland and Leader of the SNP	26.06.16	1	10.57
Sajid Javid	MP, Business Secretary	26.06.16	2	8.40
Hilary Benn	MP, Labour	26.06.16	3	5.30
Iain Duncan Smith	MP, Conservative	26.06.16	4	10.95
Andrea Leadsom	MP, Minister of State for Energy	03.07.16	2	9.48
Len McCluskey	General Secretary, Unite	03.07.16	3	0.97
Michael Gove	MP, Secretary of State for Justice	03.07.16	4	6.52
Arron Banks	Businessmen & Political UKIP Donor	10.07.16	2	4.50
Jeremy Corbyn	MP, Leader of the Opposition	10.07.16	3	11.40
Angela Eagle	MP, Labour leadership contender	17.07.16	1	1.43
Owen Smith	MP, Labour leadership contender	17.07.16	2	1.38
Nicola Sturgeon	First Minister of Scotland and Leader of the SNP	17.07.16	3	5.10
Justine Greening	MP, Education Secretary	17.07.16	4	8.53
Lord Paddy Ashdown	Former Liberal Democrat Leader	24.07.16	1	5.93
Patrick McLoughlin	Conservative Party Chairman	24.07.16	2	3.68
Ed Balls	Former Shadow Chancellor	04.09.16	1	1.68
Theresa May	Prime Minister	04.09.16	2	11.75
Owen Smith	MP, Labour Leadership Contender	11.09.16	2	4.17
Mark Thompson	Former BBC Director General	11.09.16	3	3.43
Amber Rudd	Home Secretary	11.09.16	4	10.57
Tim Farron	MP	18.09.16	3	5.50
Nigel Farage	MEP	18.09.16	4	1.70
Tim Farron	MP	18.09.16	4	1.48
Boris Johnson	MP, Secretary of State for Foreign & Commonwealth Affairs	25.09.16	1	5.75
Jeremy Corbyn	MP, Leader of the Opposition	25.09.16	3	4.52
Sir Craig Oliver	Former Director of Communications for Prime Minister	02.10.16	1	9.53
Theresa May	Prime Minister	02.10.16	2	13.57
Sir Kier Starmer	MP, Shadow Brexit Secretary	09.10.16	1	11.08
Michael Fallon	MP, Secretary of State for Defence	09.10.16	2	3.13
Nick Clegg	Former Deputy Prime Minister	16.10.16	2	7.37
Priti Patel	MP, Secretary of State for International Development	16.10.16	3	9.40
Nicola Sturgeon	First Minister of Scotland and Leader of the SNP	16.10.16	4	10.15
Susan Evans	UKIP Leadership Candidate	23.10.16	1	1.25
Hilary Benn	Chair of the Committee for Exiting the EU	23.10.16	2	9.03
Chris Grayling	Secretary of State for Transport	23.10.16	3	3.47

Greg Clark	MP, Business Secretary	30.10.16	2	12.52
Nigel Farage	UKIP Leader	06.11.16	1	4.33
Gina Miller	British Business Owner	06.11.16	2	1.68
Nigel Farage	MEP	06.11.16	2	1.98
Jeremy Hunt	MP, Secretary of State for Health	06.11.16	3	6.72
Jeremy Corbyn	Leader of the Opposition	13.11.16	1	10.50
Marine Le Pen	Leader of Front National Party, France	13.11.16	2	10.75
Crispin Blunt	Foreign Affairs Select Committee Chair	13.11.16	3	3.73
Sir Stuart Peach	Chief of Defence Staff	13.11.16	4	0.78
John McDonnell	MP, Shadow Chancellor	20.11.16	1	1.70
Philip Hammond	MP, Chancellor of the Exchequer	20.11.16	2	11.43
Philip Hammond	MP, Chancellor of the Exchequer	20.11.16	3	1.00
John McDonnell	MP, Shadow Chancellor	20.11.16	3	0.82
Emily Thornberry	MP, Shadow Foreign Secretary	27.11.16	2	10.05
Michael Gove	MP, Conservatives and Change Britain	27.11.16	3	12.65
Paul Nuttall	MEP, UKIP Leader	04.12.16	1	0.53
Boris Johnson	MP, Secretary of State for Foreign & Commonwealth Affairs	04.12.16	2	7.75
Boris Johnson	MP, Secretary of State for Foreign & Commonwealth Affairs	04.12.16	3	2.35
Sir Keir Starmer	Shadow Secretary of State for Exiting the European Union	04.12.16	3	2.35
Fabian Picardo	Chief Minister of Gibraltar	11.12.16	1	4.15
Diane Abbott	MP, Shadow Secretary of State for the Home Department	11.12.16	2	6.30
George Osbourne	MP, Former Chancellor	18.12.16	1	14.65
Liam Fox	MP, Secretary of State for International Trade	18.12.16	2	12.00
Ken Clarke	MP, Conservative	08.01.17	1	7.28
Justine Greening	MP, Secretary of State for Education	08.01.17	2	9.65
Nicola Sturgeon	First Minister of Scotland and Leader of the SNP	08.01.17	3	14.27
James Brokenshire	MP, Secretary of State for Northern Ireland	15.01.17	1	5.30
Jeremy Corbyn	MP, Leader of The Labour Party	15.01.17	2	8.55
Nick Clegg	MP, Exiting the EU Spokesperson for the Liberal Democrats	22.01.17	1	7.03
John McDonnell	MP, Shadow Chancellor of the Exchequer	22.01.17	2	5.78
Theresa May	Prime Minister	22.01.17	3	7.35
Harriet Harman	MP, Labour	29.01.17	2	1.05
David Gauke	MP, Chief Secretary to the Treasury	29.01.17	3	4.42
Tim Farron	MP, Leader, Liberal Democrats	29.01.17	4	5.87

Emily Thornberry	MP, Shadow Secretary of State for Foreign Affairs	05.02.17	1	10.28
Chris Grayling	MP, Secretary of State for Transport	05.02.17	2	1.70
David Lidington	MP, Leader of the House of Commons	12.02.17	2	3.48
Tom Watson	MP, Deputy Leader of the Labour Party	12.02.17	3	5.00
Lord Peter Mandleson	Labour	19.02.17	1	12.40
Liz Truss	MP, Secretary of State for Justice	19.02.17	2	5.20
Peter Whittle	UKIP Deputy Leader	26.02.17	1	1.42
Sir Patrick McLoughlin	MP, Conservative Party Chairman	26.02.17	2	3.23
Philip Hammond	MP, Chancellor of the Exchequer	05.03.17	3	7.13
Gerry Adams	Leader, Sinn Fein	12.03.17	1	1.63
Crispin Blunt	MP, Chair of Foreign Affairs Committee	12.03.17	2	4.55
Rebecca Long-Bailey	MP, Shadow Secretary of State for Business, Energy & Industrial Strategy	12.03.17	3	1.43
David Davis	MP, Secretary of State for Exiting the European Union	12.03.17	4	11.54
Ruth Davidson	Leader of the Scottish Conservatives	19.03.17	2	5.87
Tony Blair	Former Prime Minister	19.03.17	3	9.83
Sir Keir Starmer	MP, Shadow Secretary of State for Exiting the European Union	26.03.17	2	7.31
Amber Rudd	MP, Home Secretary	26.03.17	3	2.12

(Note: MP is Member of Parliament; MEP is Member of European Parliament)