How can use of the Theoretical Domains Framework be optimized in qualitative research? A rapid systematic review

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**Purpose.** The Theoretical Domains Framework (TDF) is an integrative framework which can facilitate comprehensive assessment of behavioural determinants in qualitative studies. However, studies can become entirely deductive if they adhere rigidly to the provided guidance and may thus overlook important factors. This review identified the number of TDF-related qualitative publications employing health care professional (HCP) or patient/public samples (stage 1) and investigated the specific methods used and impact on findings in research involving patient/public populations, with consideration of how TDF use could be optimized in such studies (stage 2).

**Methods.** A rapid systematic review of TDF-based qualitative studies was conducted. Studies were included in stage 1 that had (1) used qualitative methods of both data collection and analysis and (2) used the TDF to inform data collection and/or analysis. Stage 2 included studies from stage 1 that employed patient/public populations and explored influences of behaviour. These studies were coded for instances of TDF use with respect to data collection, analysis, and reporting of findings.

**Results.** In stage 1, 186 TDF-based qualitative studies were identified (HCP = 123; patient/public = 43; both = 20). Thirty-eight of these were eligible for inclusion in stage 2. Many of these studies used the TDF in a highly structured way within data collection, and the majority used a deductive approach to analysis. Most studies presented findings confined to TDF domains, with no non-TDF material presented.

**Conclusions.** Rigid operationalization of the TDF in qualitative studies may result in determinants being overlooked. We propose recommendations for flexible use of the TDF in order to optimize its use in exploratory qualitative research.

**Statement of contribution**

What is already known on this subject?
The Theoretical Domains Framework (TDF) is an overarching theoretical framework comprised of 14 domains, integrating constructs from multiple theories relating to health behaviour change. The TDF can be used within qualitative research to facilitate identification of the determinants of a given behaviour. However, it is unclear whether the current available guidance represents the optimal way

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DOI:10.1111/bjhp.12437
of employing the TDF in qualitative studies, or whether such a structured approach may lead to important factors being overlooked.

What does this study add?
- Many qualitative studies have used the TDF rigidly in data collection and used a deductive approach to analysis.
- Highly structured application of the TDF appears to eliminate the possibility of non-TDF-related ideas to be identified.
- We recommend including an inductive aspect to analysis in qualitative studies seeking to identify behavioural determinants.

The MRC guidance on the development of complex interventions advocates the utilization of theoretical approaches in order to develop an understanding of the likely process involved in behaviour change (Craig et al., 2008). There is, however, an array of theories within health behaviour research from which to choose. This makes selection of a particular theory for intervention design problematic (Michie et al., 2005): behaviour change research and intervention design based upon just one or a few theories risks omitting important factors that may determine a behaviour.

The Theoretical Domains Framework (TDF; Michie et al., 2005) addressed this issue by offering an overarching theoretical framework that integrates constructs from multiple theories. The TDF was derived from 33 theories of behaviour that together incorporated 128 key theoretical constructs relevant to health behaviour change. The resulting framework originally identified 12 theoretically distinct domains; however, this has since been revised to comprise 14 domains of theoretical constructs, for example knowledge, beliefs about consequences, and social influences (Cane, O’Connor, & Michie, 2012).

A core strength of the TDF is its attempt at comprehensive theoretical coverage. For example, Dyson, Lawton, Jackson, and Cheater (2011) used randomized designs to investigate use of interview schedules based on the TDF in comparison with atheoretical methods, using interviews, focus groups, and a questionnaire concerning hand hygiene behaviour. They found that beliefs were elicited by the TDF-based data collection approaches that had not been identified in studies with no theoretical basis. Further, TDF-based approaches were more likely than atheoretical approaches to elicit participant beliefs concerning the role of emotional factors in behaviour, demonstrating that use of the TDF can identify constructs that are not simply rational (i.e., instrumental) appraisals of a behaviour (Dyson et al., 2011). Based on this evidence, the TDF has been labelled as an ‘inclusive’ rather than a ‘selective’ approach within exploratory health-related research (Francis, O’Connor, & Curran, 2012).

To identify the behaviour change processes likely to be most relevant to behaviour change interventions, Michie et al. (2005) proposed example interview questions derived from the TDF. These can be used to facilitate comprehensive assessment of the determinants of the given behaviour, including identification of the barriers to and facilitators of behaviour change. Further advice is provided by Atkins et al. (2017) relating to the collection and analysis of qualitative data using the TDF. This guidance includes the following: developing an interview schedule using TDF-based questions; developing a coding framework using TDF-related statements; and tabulating data using the TDF in the reporting of findings.
However, if such guidance is applied in a highly structured manner, qualitative TDF-based studies risk becoming entirely theory-driven and important factors that do not fit within domains could be overlooked. We have identified four potential problems that may arise from the inflexible use of the TDF within qualitative studies. These relate to topic guide questions, structure, and language use, and the approach taken to the analysis and presentation of results.

First, if TDF-based topic guides used in qualitative research are too constraining in the inclusion of interview questions, participants may only respond with views and opinions that fit within the specified theoretical domains. In the guidance prescribed by Michie et al. (2005) and Atkins et al. (2017), only interview questions related to TDF domains are suggested. Although it is important to cover TDF domains, such a deductive approach leaves little room for ideas not related to the theoretical domains of the TDF to be elicited. Such an approach could result in issues that are important to the respondent being overlooked if the TDF is not genuinely comprehensive.

Second, qualitative TDF-based studies may ask questions in clusters according to the theoretical domains they relate to (e.g., all questions related to ‘social influences’ grouped together). This could result in data becoming self-contained within each domain, with potential relationships between constructs and domains being overlooked. Moreover, the interview may become repetitive due to similarities in questions probing different domains (e.g., ‘knowledge’ and ‘beliefs about consequences’). It is widely recognized that qualitative interviews should reflect natural conversation, whereby questions and answers follow each other logically and a continuous flow is maintained (Rubin & Rubin, 2005). Repetition or a sudden change in topic (i.e., transitioning between domain questions without a clear link to the previous discussion) may disrupt the logical flow of the interview, be confusing to interviewees, or appear to interviewees to be assessing knowledge rather than subjective beliefs or experience.

Third, example questions proposed in the TDF contain high-level or technical language (e.g., ‘to what extent do physical or resource factors facilitate or hinder [behaviour]?’; Michie et al., 2005). This may confuse participants, particularly those from patient/public populations. It may be helpful to adapt the question structure and language use so that questions are more accessible to respective respondents. Indeed, TDF researchers have advised using language relevant to the target population (Atkins et al., 2017).

Finally, with regard to data analysis, qualitative studies based on the TDF may take a solely deductive approach. For example, the TDF domains may be used to develop a priori coding frameworks rather than allowing the researcher to identify issues of importance to the participant which may or may not be consistent with TDF domains. Inductive versus deductive reasoning has been widely debated within qualitative methodology literature (Ormston, Spencer, Barnard, & Snape, 2014). Deductive processes have been utilized in some areas of qualitative research, for example in applied policy research where specific information requirements need to be met, often in a restricted time frame (Ritchie & Spencer, 2002). However, qualitative research is more usually conducted with an inductive approach, whereby conclusions are drawn based on the data obtained with a focus on rich description and emergent concepts and theories. In this respect, it can be considered unhelpful to use preconceived theories solely as a basis for data analysis (Hammersley & Atkinson, 1995), and qualitative researchers should remain open to emergent ideas and themes (Layder, 1993). This is particularly useful in the present context when research questions focus on investigating experiences and determinants of behaviour, including the wider influences on behaviour.
The guidance from Atkins et al. (2017) does discuss use of an inductive approach to analysis; however, they suggest firstly coding data into TDF domains prior to employing inductive processes, meaning data are already confined within the domains. Though this may not be intended as a definitive rule of application, it would be helpful to include guidance as to how more inductive processes might be used in conjunction with the TDF, without first confining data to domains. This might be particularly useful for studies exploring behavioural influences with no a priori assumptions or hypothesis.

The approach taken to analysis is likely to influence the findings obtained and how these are reported. Within TDF-based qualitative studies, an overly deductive analysis may result in findings becoming self-contained within the relevant domains identified. In contrast, a more inductive approach may facilitate the identification of issues that do not fit within a TDF domain.

It is clear that the TDF represents a useful and comprehensive approach to exploratory health-related research. However, there may be a need to adapt the way in which the TDF guidance is applied to ensure its optimal use in exploratory qualitative studies. Further, the TDF was originally designed for use with health care professional (HCP) populations but it has recently also been used with patient/public samples (e.g., Cronin-de-Chavez, Islam, & McEachan, 2019; Quigley, Baxter, Keeler, & MacKay-Lyons, 2019). Although the problems identified above may be evident across the wider TDF-based qualitative literature, we believe the magnitude of impact may be greatest for studies employing patient/public populations, due to potential literacy issues or lack of familiarity with more technical language regarding behavioural influences (McGrath, Palmgren, & Liljedahl, 2019; Namageyo-Funa et al., 2014). The present study therefore aimed to document the overall number of qualitative studies using the TDF, both with HCP and patient/public participant groups. We further aimed to investigate how the TDF is used in such studies that involve patient/public populations. Specific objectives were to

1. identify the number of qualitative publications using the TDF by year using patient/public samples or HCP samples;
2. investigate how the TDF is applied in relation to the four identified potential problems in qualitative research investigating experiences and determinants of behaviour in patient/public populations;
3. consider how analysis approaches have influenced the findings of these studies and develop recommendations for how future use of this helpful framework can be optimized.

Methods

Design

We conducted a rapid systematic review. There is no clear distinction between rapid reviews and more traditional systematic reviews (Kelly, Moher, & Clifford, 2016). However, it is generally accepted that rapid systematic reviews streamline the processes involved, for example searching, compared to traditional systematic reviews in order to complete the review within a shorter time frame, whilst still maintaining the quality and rigour associated with traditional review methods (Kelly et al., 2016). As we aimed to yield a general overview of TDF use within qualitative studies rather than quantify items across the entire literature for statistical evaluation, we believe that a rapid review was proportionate.
**Literature search**

A systematic scoping search was conducted in March 2019 using Scopus to identify studies that have used the TDF within qualitative behaviour change research (from 2005 onwards). The Scopus platform was chosen due to its comprehensive coverage of peer-reviewed literature across multiple disciplines, including medicine and health sciences. The search terms used were as follows: (TITITLE-ABS-KEY (“theoretical domains framework”) OR TITITLE-ABS-KEY (tdf) AND TITITLE-ABS-KEY (qualitative) OR TITITLE-ABS-KEY (interview) OR TITITLE-ABS-KEY (“focus group”) OR TITITLE-ABS-KEY (“mixed method”)). Backward searches were conducted on all papers included in stage 2, whereby reference lists of all included studies were searched for additional relevant studies.

**Inclusion criteria**

**Stage 1**

Studies had to be written in English, to have used qualitative methods of both data collection and data analysis (including content analysis where used as an open-ended method of analysis of qualitative data; Hsieh & Shannon, 2005), and to have used the TDF to inform data collection, data analysis, or both. Mixed-method studies in which the qualitative elements adhered to the above criteria and were presented separately to the quantitative data were included.

**Stage 2**

In addition to the criteria for stage 1, studies eligible for stage 2 recruited patient or public samples as opposed to HCP populations. Studies that recruited both patient/public and HCP samples were included if the results of each population were reported separately. Additionally, qualitative data from mixed-method studies, in which the qualitative data were analysed and reported separately to quantitative data (and were described in sufficient detail to undertake data synthesis), were included. Studies were excluded if they had a specific primary focus on intervention development/evaluation using the TDF rather than a focus on exploring influences and determinants of behaviour.

**Screening**

**Stage 1**

Title and abstract screening was conducted by the first author on all records, with any obviously irrelevant papers excluded. Full texts of papers included after title and abstract screening were retrieved and screened in detail by the first author for inclusion in analysis.

**Stage 2**

Studies included as either patient/public populations of both HCP and patient/public populations in stage 1 were then screened for inclusion in stage 2 analysis by the first author.

**Data extraction**

For stage 1, qualitative studies using the TDF were organized by study population (patient/public, HCP, or both), to enable identification of the number of qualitative publications using the TDF by year and respondent population.
For studies meeting inclusion criteria for stage 2, details concerning research aims, sample size, country of study, data collection method, and type of qualitative analysis for each article were extracted and recorded on a standard data extraction form.

Studies included at stage 2 were coded for instances and types of TDF use in the following ways (stage 2a):

1. Questions in topic guide mapped onto each TDF domain by study authors.
2. Questions in topic guide clustered according to theoretical domain related to.
3. Use of high-level or technical language regarding behavioural influences in questions.
4. Type of analysis (deductive, inductive, or combination of both).

Coding was undertaken by the first author on all included studies, with a random sample of 20% double-coded by a second researcher. The chance-correct kappa values calculated to assess inter-rater reliability for each coding category were as follows: (1) $\kappa = 1.00$, (2) $\kappa = 1.00$ (3) $\kappa = 1.00$ (4) $\kappa = .33$. According to conventional criteria, 1.00 is considered to be ‘perfect’ agreement, whereas .33 is considered to be ‘fair’ agreement (Landis & Koch, 1977). Disagreements in category 4 (analysis type) were resolved through discussion between the two researchers, and the criteria for this category were refined for clarity. Studies were considered deductive where the TDF was used as the sole framework for coding and theme generation, with no consideration of non-TDF material within the analysis. In contrast, studies categorized as inductive did not use the TDF to inform either coding or higher level analysis processes (i.e., TDF used only to assist data collection). Studies considered both inductive and deductive may have used the TDF in coding or higher level analysis, but also allowed for non-TDF material to be considered within the analysis, or may have categorized inductive themes into TDF domains (see Appendix S1 for full criteria). Based on the refined criteria, double coding was undertaken with another random sample of 20% of included studies. The resulting agreement was $\kappa = 1.00$.

In order to explore how analysis approaches influenced study findings, more nuanced coding was undertaken by the first author (stage 2b). This involved coding for specific ways in which the TDF was used in the analysis and reporting of findings within the included studies in relation to the overall ‘type of analysis’ (see stage 2a). These were as follows:

1. Analysis processes
   a. Coding both inductive and deductive (both TDF and non-TDF material coded).
   b. Initial coding inductive, then categorized into TDF domains.
   c. Initial coding deductive (e.g., TDF used as a coding framework), then inductive higher level analysis/theme generation.
   d. Initial coding deductive (e.g., TDF used as coding framework), then overarching themes TDF-based.
      i. Secondary ‘inductive’ analysis for sub-categories/themes within each TDF domain.

2. Reporting of findings
   a. Overarching themes not TDF-based, subsequently categorized into TDF domains
   b. Some findings written within TDF domains but non-TDF material also presented
   c. Results presented within TDF domains – no non-TDF material presented.

Data synthesis
For stage 1, a graph of frequencies of TDF-related qualitative studies per year for each study population was produced. For stage 2a, frequencies of findings relating to data
collection and analysis were calculated and a frequency table was produced. For stage 2b, frequencies for the more nuanced analysis and reporting of findings coding categories were calculated, a frequency table was produced, and illustrative examples were collated in a table. In particular, we identified whether factors that did not fit within the TDF domains were elicited in studies and considered how study methods may have influenced this.

**Results**

Database searches yielded 298 records. Figure 1 outlines the number of studies identified, excluded, and included at each stage of the screening process. Stage 1 resulted in 186 studies being included. Thirty-eight studies were included in stage 2 of the analysis (see Appendix S2 for study characteristics).

**Stage 1: Number of qualitative publications using the TDF by year using patient/public or health care professional samples**

Figure 2 shows the number of qualitative publications using the TDF by year and study population. There appears to have been an increase in the overall number of qualitative studies that have used the TDF in recent years. The majority of studies have involved HCP populations; however, use of patient/public samples in qualitative TDF-based studies also appears to be rising.

**Stage 2a: Coding for instances and types of TDF use**

Table 1 shows a summary of the results of the coding for each category of TDF use in data collection and analysis. References for included studies are shown in Appendix S3 (see Appendix S4 for a breakdown of coding for each included study).

Over half of the studies mapped the questions in their topic guides directly onto the TDF domains \((n = 22, 57.9\%)\), and the majority of studies also clustered the questions according to the domains they were related to (e.g., all questions for the domain of ‘knowledge’ were asked together) \((n = 20, 52.6\%)\). However, most studies did ask questions using language and phrasing suitable for lay respondents, with only 10 demonstrating examples of jargon or non-lay phrasing in their respective topics guides (26.3%).

In terms of the type of analysis used, the majority of studies \((n = 28, 73.7\%)\) employed a purely deductive approach. The remaining studies included both inductive and deductive approaches to working with the data, with no studies employing a purely inductive approach.

**Stage 2b: Coding for specific ways in which the TDF was used in the analysis and reporting of findings and consideration of how analysis approaches may have influenced the findings of studies**

Table 2 presents a more detailed overview of the specific ways in which the TDF was used within the analysis processes and reporting of findings of the included studies. In terms of analysis processes, the majority of studies (28) directly linked initial coding to the TDF domains or used the TDF domains as an *a priori* coding framework, for example as the
basis for framework or content analysis. Five of these studies stated that they conducted an ‘inductive’ analysis for emergent sub-themes within each TDF domain (having coded the data according to the TDF). For example, Arden, Drabble, O’Cathain, Hutchings, and Wildman (2019) initially coded their data according to the 14 TDF domains and then subsequently created sub-themes by conducting an ‘inductive content analysis’ on the statements under each domain. Three studies coded for both TDF and non-TDF-related material, and four studies initially generated data-based insights and then categorized these into the TDF domains. The remaining three studies initially coded according to the TDF and then conducted an inductive higher level analysis/theme generation.
There were three main ways in which the data were reported in study findings (see Table 2), with each study categorized as one of the three (see Appendix S5): inductive overarching themes subsequently linked to TDF; both TDF-related findings and non-TDF-related findings presented; themes presented only within TDF domains. Illustrative examples are discussed in further detail in Table 3.

**Figure 2.** Number of qualitative studies using the Theoretical Domains Framework (TDF) by year and study population (up to March 2019). HCP = Health care professional.

| Coding item                                           | Number of studies | Percentage |
|-------------------------------------------------------|-------------------|------------|
| Questions mapped directly onto each domain            |                   |            |
| Yes                                                   | 22                | 57.9       |
| No                                                    | 14                | 36.8       |
| Unclear                                               | 2                 | 5.3        |
| Questions clustered according to each domain related to|                   |            |
| Yes                                                   | 20                | 52.6       |
| No                                                    | 16                | 42.1       |
| Unclear                                               | 2                 | 5.3        |
| Use of jargon/non-lay phrasing in questions           |                   |            |
| Yes                                                   | 10                | 26.3       |
| No                                                    | 24                | 63.2       |
| Unclear                                               | 4                 | 10.5       |
| Type of analysis                                       |                   |            |
| Deductive                                             | 28                | 73.7       |
| Inductive                                             | 0                 | 0.0        |
| Both                                                  | 10                | 26.3       |
The findings of 28 of the included studies were presented within the TDF domains, with no additional material presented outside of the TDF. These studies comprised the ‘deductive’ category in Table 1. Of these studies, some reported rich description and narratives within the domains identified (Haith-Cooper, Waskett, Montague, & Horne, 2018), whereas other studies did not explore narratives in detail, instead focusing on the relative weighting (e.g., frequencies) of each domain identified (McBain, Begum, Rahman, & Mulligan, 2017).

Five studies reported overarching inductive themes, which were subsequently mapped onto the relevant TDF domains (e.g., Burgess et al., 2015). The remaining five studies reported some of their findings within TDF domains, but also presented additional findings/materials that were not directly linked to the TDF (e.g., Martis, Brown, McAra-Couper, & Crowther, 2018). Combined, these 10 studies comprised the ‘both’ (inductive and deductive) category in Table 1. Interestingly, four of the five studies presenting both TDF and non-TDF-related findings did not structure their data collection exclusively around the TDF; rather than mapping and clustering topic guide questions according to each TDF domain, they used more general open-ended questions relating to their respective topics, allowing opportunity for both TDF and non-TDF-related responses. Use of the TDF in data collection for the fifth study in this group was unclear as the interview topic guide was not published. The non-TDF data were of two main kinds: providing a fuller understanding of the determinants of behaviours and changes in people that are not specifically determinants of behaviour.

With respect to non-TDF information providing a fuller understanding of the determinants of behaviour, a narrow use of the TDF could lose important contextual information around how wider determinants of behaviour can interact. For example, Cronin-de-Chavez et al. (2019) and Flannery et al. (2018) developed overarching visual
Table 3. Illustrative examples of methods of reporting results in qualitative Theoretical Domains Framework (TDF)-based studies using patient/public samples

| Reference          | Study Aims                                                                                                                                   | Description of Results                                                                 |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| Burgess et al. (2015) | To explore influences on the decision to attend or not among a group of people invited to receive an NHS health check. | • Reported five data-driven themes, e.g., ‘awareness and expectations of the NHS Health Check’, ‘civic responsibility’, and ‘practical barriers to attending’.  
• The relationship between these themes and the TDF domains was explored and presented within a table.  
• All presented themes fit within respective TDF domain (e.g., ‘practical barriers to attending’ fit within the scope of the domain ‘environmental context and resources’). |
| Martis et al. (2018)  | To identify enablers and barriers for women with gestational diabetes mellitus (GDM) to achieve optimal glycaemic control.       | • Two initial themes were presented which were not directly categorized into TDF domains. These related to women’s initial responses to the diagnosis of GDM and their responses to living with GDM at the time of the interview. These were discussed without reference to the TDF, and percentages of participants holding each belief, and example corresponding quotes were given.  
• Themes concerning barrier and enablers were identified and categorized within relevant TDF domains. These themes were discussed in text under the relevant domain headings, with corresponding quotes.  
• Tables of relevant TDF domains with corresponding barriers and enablers were also presented |

Continued
| Reference                  | Study Aims                                                                 | Description of Results                                                                                                                                                                                                 |
|----------------------------|----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Themes presented only within TDF domains                                                                                                  | Each of the 14 domains was presented in a table, alongside corresponding belief statements, the total number of participants expressing each belief statement, and the total number of quotations relating to each belief statement. |
| McBain et al. (2017)       | To identify the barriers and enablers of effective insulin self-titration in people with diabetes. | Each relevant theme was written under the related TDF heading, however the narratives were not explored in particular detail, and links between domains were not explored.                                                |
| Haith-Cooper et al. (2018) | To explore the barriers and facilitators of the uptake and adherence of physical activity among asylum seekers in the UK.     | All results presented under the relevant TDF domains                                                                                                                                                                     |
|                            |                                                                            | Produced rich description and narratives within the relevant domains identified, for example                                                                                                                                                               |
|                            |                                                                            | a. explored how asylum seekers construed the terms ‘physical activity’, ‘exercise’ and ‘moderate intensity’ within knowledge domain                                                                                                                   |
|                            |                                                                            | b. within the ‘beliefs about capabilities’ domain, authors explored how having asylum seeker status influenced perceived capabilities for physical activity, and nuances in terms of confidence and influence of health conditions were also explored. |
|                            |                                                                            | This detail and nuance was evident across the domains within the results and was appropriately illustrated through example quotations from participants.                                                                                     |
frameworks of factors influencing parents’ greenspace use, and factors influencing physical activity in overweight pregnant women, respectively. These frameworks provide insight into the interplay between factors influencing the behaviours and how they fit together as a whole. Further, Cronin-de-Chavez et al. (2019) identified three themes which were not categorized into TDF domains, but were accounted for by an alternative framework (the Health Map): Natural environment, built environment, and activities. For example, children’s interactions with animals in the natural environment were identified as an enabler to using greenspaces, and mixed-age play areas were a barrier due to being perceived as dangerous for younger children. Further, the types of activities children could engage in greenspaces, for example digging soil and running around without holding parents’ hands, facilitated greenspace use. Use of this additional framework enabled a more nuanced understanding of structural-level determinants of greenspace use, and their relationship to person-level determinants (which were largely accounted for by the TDF).

Non-TDF information also appears to allow a better understanding of changes in people that are not specifically determinants of behaviour, but might be better conceptualized as moderators of intervention effects. For example, Martis et al. (2018) reported initial responses to diagnosis of gestational diabetes mellitus (GDM) and living with GDM at the time of interview. These themes were not necessarily directly related to a specific behaviour, therefore categorizing into TDF domains would not be particularly relevant. Rather, they provided important context relating to how responses to diagnosis and living with GDM may influence determinants of glycaemic control. Herbec, Tombor, Shahab, and West (2018) reported smokers’ reactions to facts and recommendations regarding nicotine replacement therapy. This included surprise at previously misinformed views, and how suggesting new strategies that could be more effective elicited feelings of positivity in participants. It could be argued that these findings could relate to the TDF domains of ‘knowledge’ and ‘emotion’; however, separating them into individual domains would have likely resulted in loss of context and narrative within this theme. Finally, Rubinstein, Marcu, Yardley, and Michie (2015) provided nuanced contextual detail relating to how responses differ according to either uncertain or severe pandemic influenza scenarios, for example ‘wait and see’ versus taking action, which could influence enablers and barriers to being vaccinated and taking antiviral medicines.

**Discussion**

The number of qualitative publications employing the TDF has increased over recent years. The majority of such studies have employed HCP samples; however, use of patient or public samples in qualitative TDF studies is increasing. Of the 38 published qualitative studies using the TDF with patient or public respondents, over half of these studies used the TDF in a highly structured way in their interview or focus group topic guides with questions mapped directly onto the TDF domains. The majority of these also clustered the questions according to the related domains. Use of jargon or non-lay terminology and phrasing in topic guides was not particularly common within the included studies, with over half of the included studies adapting their questions for a lay audience. Three quarters of studies applied the TDF deductively in their analysis, whilst the remaining studies employed a combination of both inductive and deductive approaches to analysis. The majority of studies presented findings confined within the domains of the TDF, with no
non-TDF material presented (these corresponded to studies coded as ‘deductive’). The remaining studies either presented overarching inductive themes which were subsequently categorized into TDF domains, or presented findings which were both TDF and non-TDF-related (these corresponded to studies categorized as both inductive and deductive).

This review provides some support for the comprehensiveness and inclusivity of the TDF, demonstrating its value in use with patient/public populations in qualitative research exploring influences and determinants of behaviour. In some studies using both an inductive and deductive approach, all of the overarching inductive themes produced fit within the scope of the TDF (e.g., Burgess et al., 2015). On the other hand, as some studies produced findings that were not related to the TDF (e.g., Martis et al., 2018), it seems there is a risk that identification of non-TDF-related material may be overlooked by employing a purely deductive approach. Particularly, important contextual influences on behaviour and other potential changes in participants that can act as moderators of behaviour may not be elicited if findings are contained within domains in the first instance; therefore, inductive approaches can facilitate more synergistic findings. In this respect, although the existing guidance provided by Michie et al. (2005) and Atkins et al. (2017) is useful, overly structured application of such guidance may become restrictive in studies of an exploratory nature (particularly when employing patient/public samples).

It is possible for rich data to be obtained through analysis contained within TDF categories (e.g., Haith-Cooper et al., 2018); therefore, a deductive approach to analysis should not necessarily be considered limited in this respect. Indeed, it seems that the TDF can provide sufficient scope to account for all study findings in some cases, even when inductive approaches are utilized (e.g., Burgess et al., 2015). However, there are also instances of studies producing findings that do not fit within the TDF (e.g., Herbec et al., 2018; Martis et al., 2018). It would therefore seem worthwhile to use both inductive and deductive approaches from the early stages of analysis in qualitative studies exploring influences and determinants of behaviour to ensure that non-TDF material is considered alongside that which fits within the domains. This would also ensure that context and detail gained from an inductive approach to data analysis is not lost by confining analysis solely to the TDF domains, as may have occurred in some of the studies categorized as ‘deductive’ in the current review. Although we acknowledge that there may be some instances in which applying a purely deductive approach would be suitable for the research questions asked, exploratory studies investigating influences, experiences, and determinants of behaviour should remain open to identifying all relevant ideas.

In order to optimize the usefulness of the TDF in exploratory qualitative work with patient/public populations, less rigid application of the TDF could help respondents to speak more freely on the given topic and reflect more natural conversational conventions, in line with good practice recommendations for interviews (Rubin & Rubin, 2005). Indeed, in the current review, most studies that identified non-TDF-related issues employed a more open approach to data collection. For instance, rather than mapping and clustering questions according to the TDF domains, broader open-ended questions could prompt the respondent to discuss factors related to theoretical domains should they be relevant, without omitting what the respondent feels is important to them. This would give a more natural narrative flow to the interview and enable a more holistic understanding of participants’ perspectives on the behaviour to be gained, whilst still ensuring participants consider all the potentially relevant theoretical factors. This is similar to the ‘funnelling’ process often used in qualitative data collection, whereby
interviews start broad (i.e., less structured) and become narrower (i.e., more focused), thus enabling exploration of participants’ own perspectives whilst also allowing exploration of pre-defined areas of interest to the researcher (Morgan, 1997).

Moreover, if the TDF questions were used to influence the topic guide rather than as a rigid structure, with participants given the freedom to offer their perspectives in a less constrained way, it may facilitate the discerning of relationships between constructs and domains. For example, Cronin-de-Chavez et al. (2019) identified links between themes in a framework describing barriers and enablers to greenspace use. Knowledge of relationships or interactions between domains and constructs could in turn serve to better inform more effective behaviour change interventions.

There are several strengths of this rapid review. We have provided novel insights in terms of the specific ways in which the TDF has been used within qualitative studies using patient/public populations. The review was conducted using established systematic processes to ensure rigour and quality were maintained throughout, and bias minimized in terms of literature searching, appraisal, and synthesis. Furthermore, use of double coding and the resulting high agreement between researchers enables confidence in the results we have produced.

There are also some limitations of this review. We employed a relatively simple search strategy in order to facilitate a timely review process proportionate to the aims of the review, therefore increasing the risk of omitting potentially relevant studies. However, it is a common trait of rapid reviews to employ less rigorous search strategies for study identification (Tricco et al., 2015). Rapid review methods risk omitting some relevant studies, but aim to obtain similar findings to studies employing more exhaustive systematic review methods. Indeed, similar statistical results have been produced for studies using more limited search strategies compared to those using complex search strategies (Egger, Juni, Bartlett, Holenstein, & Sterne, 2003). In the present review, two known papers that met the inclusion criteria were not identified through the search (Mcdonald, O’Brien, White, & Sniehotta, 2015; McGowan, Powell, & French, 2019). However, the McGowan et al. (2019) paper was only published in early online format at the time our search was undertaken (it would be identified if we had re-run the search) and the McDonald et al. (2015) paper referred to the TDF as the Theory Domains Framework throughout (instead of TDF). Taken as a whole, it would seem that our search strategy was fit for purpose.

Conclusions

It is clear that the TDF is a useful and comprehensive theoretical approach to identifying influences on behaviour and developing an understanding of the processes involved in health behaviour change. However, the operationalization of the TDF in qualitative studies employing patient/public populations may undermine its utility. Qualitative work could usefully utilize the TDF in conjunction with a more inductive approach to research. By incorporating TDF-related questions less rigidly into a more general topic guide about the behaviour in question, a broader and deeper understanding of participants’ perspectives of the behaviour may be gained. Inclusion of an inductive approach within analysis, particularly the initial coding of data, could ensure that non-TDF-related factors are not overlooked, and nuance and context are not lost. Such strategies would maximize the usefulness of the TDF in the development of health behaviour change interventions.
Acknowledgements

This work was funded by the Economic and Social Research Council (ESRC) and the University of Manchester President’s Doctoral Scholar award. We would like to thank Jack Benton for his valuable help with coding in this review.

Conflicts of interest

All authors declare no conflict of interest.

Author contributions

Laura J. McGowan (Conceptualization; Formal analysis; Funding acquisition; Investigation; Methodology; Project administration; Writing – original draft; Writing – review & editing); Rachael Powell (Conceptualization; Methodology; Supervision; Writing – review & editing) David P. French (Conceptualization; Methodology; Supervision; Writing – review & editing; Funding acquisition: ESRC and University of Manchester President’s Doctoral Scholar award).

Data availability statement

The data that support the findings of this study are available in the Supporting Information of this article.

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Received 7 January 2020; revised version received 9 May 2020

Supporting Information
The following supporting information may be found in the online edition of the article:

Appendix S1. TDF coding – analysis criteria.

Appendix S2. Summary characteristics of included studies.

Appendix S3. References.

Appendix S4. Coding table for each category of TDF-use.

Appendix S5. Reporting of study findings.