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# Factors influencing the prescribing behaviour of independent prescriber optometrists: a qualitative study using the Theoretical Domains Framework

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## Abstract

**Purpose:** Whilst the number of independent prescriber (IP) optometrists in the United Kingdom is increasing, there is limited evidence describing the experiences of these individuals. The Theoretical Domains Framework (TDF) provides an evidence-based approach to understand determinants of behaviour. This conceptual framework can enable mapping to the COM-B behaviour change model and the wider Behaviour Change Wheel to develop interventions to optimise behaviour-change and healthcare processes more systematically. The study aimed to use the TDF to identify the factors that influence independent prescribing behaviour, and to map these findings to the COM-B system to elucidate the relevant intervention functions, in order to identify the support required by optometrist prescribers.

**Methods:** Using a qualitative design, semi-structured interviews based on the TDF were undertaken with independent prescriber optometrists. Thematic analysis was used to identify themes inductively, which were then deductively mapped to the TDF and linked to the COM-B.

**Results:** Sixteen participants (9 male, 7 female; median age 45 years, range 28–65 years), based in community ( $n = 10$ ) and hospital ( $n = 6$ ) settings, were interviewed. Eleven of the TDF domains were found to influence prescribing behaviour. Findings highlighted the need for good communication with patients (TDF domain: Skills, COM-B: Capability); confidence (TDF domain: Beliefs about capabilities, COM-B: Motivation); good networks and relationships with other healthcare professionals, e.g., general practitioners (TDF domain: Social influences, COM-B: Opportunity; TDF domain: Social/professional role and identity, COM-B: Motivation); the need for appropriate structure for remuneration (TDF domain: Reinforcement, COM-B: Motivation; TDF domain: Social/professional role and identity, COM-B: Motivation) and the provision of professional guidelines (TDF domain: Knowledge, COM-B: Capability; TDF domain: Environmental context and resources, COM-B Opportunity).

**Conclusions:** Having identified theory-derived influencers on prescribing decisions by optometrists, the findings can be used to develop a structured intervention, such as a support package to help optimise prescribing by optometrists, with the ultimate goal of eye care quality improvement.

## Introduction

Over the last two decades, the increasing burden on health-care systems has brought about changes to prescribing policy for non-medical healthcare professionals, e.g., nurses and pharmacists, with the UK considered to be at the forefront of these changes.<sup>1</sup> Prescribing against a restricted list of therapeutics was first introduced for community nurses in the UK in 1999.<sup>2</sup> Later, prescribing rights were extended to further groups of registered nurses in 2001,<sup>3</sup> with an independent prescriber defined as,<sup>4,5</sup>

“... a practitioner (e.g., doctor, nurse, pharmacist) responsible for the assessment of patients with undiagnosed or diagnosed conditions and for decisions about the clinical management required, including prescribing.”

Subsequent legislative changes allowed independent prescribing to be extended to pharmacists in 2006,<sup>6</sup> optometrists in 2008,<sup>7</sup> physiotherapists and podiatrists in 2013,<sup>8</sup> therapeutic radiographers in 2016,<sup>9</sup> and paramedics in 2019.<sup>10</sup>

The impact of independent prescribing has been reported as being advantageous in the wider healthcare setting both in the UK<sup>1,11–13</sup> and internationally.<sup>12,14–16</sup> Prescribing allowed for autonomy within the role of nursing,<sup>17–21</sup> whilst enhancing relationships between nurse practitioners and patients<sup>22,23</sup> and improving the service for patients through enabling a patient-centred approach.<sup>18,20,24,25</sup> Additionally, the impact of pharmacist independent prescribers has been widely investigated,<sup>25–30</sup> in which positive patient experiences were described,<sup>25,26,29</sup> with pharmacist prescribers reported as attentive to patient preferences and treatment options.<sup>28</sup>

Yet there is still limited evidence on the experiences of independent prescriber optometrists.<sup>1</sup> In a small number of papers, the use of quantitative surveying of therapeutic prescriber optometrists has been undertaken, in which the willingness of optometrists to undergo therapeutics training was described.<sup>31–33</sup> Those with therapeutics training were reportedly more confident in diagnosing and managing specific ocular conditions,<sup>32</sup> and in the high risk area of hospital emergency eye care there is evidence that trained and experienced independent prescriber optometrists make appropriate clinical decisions.<sup>34</sup> However, inappropriate remuneration, fear of litigation and time/cost of training were cited as barriers to undertaking therapeutics training.<sup>31</sup> Additionally, lack of remuneration has been described as a barrier to prescribing.<sup>31,33</sup>

The use of theoretical frameworks in order to understand behaviour<sup>35</sup> has previously been applied to gain insight into the prescribing behaviour of nurses<sup>36,37</sup> and pharmacists.<sup>37</sup> Using a theoretical lens through which to view the

influences on prescribing behaviour in optometry is timely, given the successful use of such methods in other areas of healthcare and the lack of in-depth perspectives representing this group in the literature. The Theoretical Domains Framework (TDF)<sup>38</sup> was developed to synthesise a range of theoretical models into one framework to understand influences on behaviour.<sup>39</sup> This combination of complex theories simplifies determinants of behaviour into 14 domains (listed in *Table 1*).<sup>38</sup> The TDF has been used widely in a number of healthcare disciplines,<sup>39</sup> including how to understand influences on non-medical prescriber behaviour.<sup>36,37</sup> Once influences on behaviour are understood, they can be mapped to a behaviour change system known as the Behaviour Change Wheel.<sup>35,40</sup> This system holds behaviour at the centre of the wheel, with Capability, Opportunity and Motivation representing the hub. These four components create the COM-B model, which highlights that for a behaviour to occur, individuals need the Capability to enact (such as knowledge and skill), Opportunity to enable (such as a conducive environment and positive social influence), and Motivation to perform (linked to beliefs, emotions, identity and habit) the Behaviour. Once these COM-B factors are identified, they can be systematically mapped further to Intervention Functions, Policy Categories and Behaviour Change Techniques<sup>41</sup> that can optimise behaviour change.

Optometrists who undergo training in independent prescribing are required to make a transition to become a competent prescriber. Such a transition requires a change in professional behaviour. Optimal behaviour change will require optometrists to have the Capability, Opportunity and Motivation to perform independent prescribing behaviour. While the COM-B constructs will offer some understanding of the influence on behaviour, the TDF can further unpack what may influence behaviour and help to identify areas for future intervention accurately. Consistent with the TDF, we sought to identify and understand from individual experience, the knowledge, skills, beliefs, confidence, relationships, intentions, goals, environment, resources and other aspects that encourage or allow prescribing by optometrists.

The aim of the study was to identify the factors that influence independent prescribing behaviour by optometrists. The objectives were to use the TDF to identify influencing factors and map these to the COM-B system to elucidate the intervention functions to target from the Behaviour Change Wheel. Such outcomes will facilitate the provision of support for new and in-training independent prescriber optometrists.

The research question was, what are the factors that influence the prescribing behaviour of independent optometrists and how might this be used to inform the development of an intervention?

**Table 1.** Interview schedule and corresponding Theoretical Domains Framework (TDF) domains

TDF domain	Interview questions
<b>Knowledge</b> An awareness of the existence of something	What knowledge do you draw upon when managing patient consultations for whom you prescribe medicines? What, if any recommendations/guidelines or protocols are you aware of?
<b>Skills</b> An ability or proficiency acquired through practice	What skills do you think are needed/helpful in managing patient consultations for which you prescribe? If you have decided not to prescribe, what skills are needed to help manage that consultation (e.g., patient education such as teaching patient to self-manage)? To what extent do you see prescribing as part of your role?
<b>Social/professional role and identity</b> A coherent set of behaviours and displayed personal qualities of an individual in a social or work setting	
<b>Beliefs about capabilities</b> Acceptance of the truth, reality or validity about an ability, talent or facility that a person can put to constructive use	How confident do you feel in your prescribing decisions? What if you are unsure about a diagnosis?
<b>Optimism</b> The confidence that things will happen for the best, or that desired goals will be attained	How confident are you that your consultations with patients will have a positive outcome? How is this affected by whether you have prescribed a medicine?
<b>Beliefs about consequences</b> Acceptance of the truth, reality or validity about outcomes of a behaviour in a given situation	What factors influence your decision to prescribe? <i>Prompt – Patient expectations and effect on patient relationship</i> <i>Prompt – The risks of not prescribing</i>
<b>Reinforcement</b> Increasing probability of a response by arranging a dependent relationship, or contingency, between the response and a given stimulus	What factors may reinforce your decision to prescribe? What factors hinder this decision process?
<b>Intentions</b> A conscious decision to perform a behaviour or a resolve to act in a certain way	What motivates you to prescribe or not?
<b>Goals</b> Mental representations of outcomes or end states that an individual wants to achieve	What are your goals when you prescribe for patients?
<b>Memory, attention and decision process</b> The ability to retain information, focus selectively on aspects of the environment, and choose between two or more alternatives	How do you decide whether or not to prescribe? What processes do you usually follow when you prescribe?
<b>Environmental context and resources</b> Any circumstance of a person's situation or environment that discourages or encourages the development of skills and abilities, independence, social competence and adaptive behaviour	What factors support or hinder your prescribing? How do systems in place support you to prescribe appropriately? What is missing?
<b>Social influences</b> Those interpersonal processes that can cause an individual to change their thoughts, feelings or behaviours	Do patients influence the way you manage consultations and whether you prescribe? How do people you work with influence your decisions around whether to prescribe? How do you think you compare with other prescribers? <i>Prompt – Others in practice? Your peers? Other healthcare professionals with whom you work?</i>
<b>Emotion</b> A complex reaction pattern, involving experiential, behavioural and physiological elements, by which the individual attempts to deal with a personally significant matter or event	How do consultations with patients for whom you prescribe make you feel? <i>Prompt – What emotional responses have you experienced in these consultations?</i> Are there consultations that are difficult or make you feel uncomfortable? How do your feelings at the time (mood, feelings towards the patient, fatigue) affect whether or not you prescribe?
<b>Behavioural regulation</b> Anything aimed at managing or changing objectively observed or measured actions	What factors may support you to prescribe more satisfactorily for the patients you see so that care is more seamless or of better quality? How do you ensure that your prescribing is appropriate to the situation?
<b>Closing questions</b>	What support would help you increase the range of medicines that you prescribe and increase your confidence in prescribing?

## Methods

### Study design

A qualitative approach using one-to-one semi-structured interviews was undertaken in order to allow participants to gain in-depth insight into factors influencing prescribing behaviour. Ethical approval was gained from the School of Optometry and Vision Sciences Research Ethics and Audit Committee, Cardiff University (#1530), on 16 December 2019. The study adhered to the principles stated in the Declaration of Helsinki and informed consent was gained from each participant.

### Recruitment

Purposive and snowball sampling methods were used to recruit participants. Using purposive methods, the researchers identified independent prescriber optometrists working in the hospital setting and in primary care (community-based independent and multiple practices), and those who had completed the prescribing course at Cardiff University, and contacted them via email and invited to participate. Participants who were identified using these methods then referred the researchers to other potential participants, i.e., snowball sampling.

### Data collection

Individuals who responded to the invitation to take part in the research were sent a participant information sheet and consent form prior to the interview. Participants were able to ask any questions prior to providing consent before their interview. Participants were interviewed either face-to-face or over the telephone by a qualitative researcher (DS). Interviews were audio-recorded and transcribed verbatim. Data collection was undertaken between December 2019 and March 2020.

The intended sample size was 10–20, consistent with models of qualitative research,<sup>42</sup> recognising an initial sample of 10 interviews after which the point of data saturation is reached when there are three consecutive interviews, without additional material arising.<sup>43</sup>

In-depth qualitative interviews based on the TDF allowed an understanding of the influences on prescribing behaviour. The interview schedule, based on the TDF (see *Table 1*), was adapted from a schedule used in a previous study of the prescribing behaviour of community practitioner nurse prescribers.<sup>36,37</sup> The wording of each question was identical to that used previously,<sup>36</sup> except for questions on the use of the British National Formulary (BNF) in the environmental context and resources domain, which were removed and questions in the social influences domain were added,<sup>37</sup> with wording

specific to antibiotics replaced by wording around prescribing in general. The questions were piloted with an optometrist undergoing training for independent prescribing and no revisions to the wording were required. Demographic data were also gathered including the length of time the participants had been qualified as an independent prescriber, their area of expertise and the geographical location of their main workplace. Additionally, participants were asked to estimate the approximate number of items prescribed in a typical month and the approximate duration of a typical consultation.

### Data analysis

Consistent with thematic analysis,<sup>44</sup> data were coded inductively, using NVivo data management software v. 12 ([www.qsrinternational.com/nvivo-qualitative-data-analysis-software/home](http://www.qsrinternational.com/nvivo-qualitative-data-analysis-software/home)) independently by one researcher (DS). Initially, familiarisation with the data was undertaken by listening to and reviewing each interview transcript individually, whilst noting items of potential interest. Then, in an iterative process, data were reviewed line by line and codes were generated, with all the data relevant to each code collated. Codes were then organised into initial themes, with all coded data relevant to each theme gathered. The themes were then reviewed against a random sample of 25% of codes in discussion with a second researcher (JA). In the case of disagreement, codes would have been discussed with a third researcher (MC); however, agreement was 100% for all codes. The themes were then discussed with MC who contributed to the final definition and naming of themes. DS then deductively mapped the themes to the TDF, in discussion with JA and MC and reviewed by an additional researcher (HF). Disagreement on the TDF mapping occurred for two themes, and was finalised in discussion with another researcher (AC). The TDF domains were then mapped to the COM-B using *Table 3* within Cane *et al.*,<sup>39</sup> and to relevant Intervention Functions using the matrix of links in *Table 2.3* of Michie *et al.*,<sup>40</sup> by AC and agreed with HF. All authors contributed to the reporting of analytic commentary, data extracts and themes.

## Results

### Participants

Sixteen participants (9 male, 7 female; median age 45 years, range 28–65 years) from both hospital ( $n = 6$ ) and community-based ( $n = 10$ ) practice were interviewed. The participants' clinical prescribing experience ranged from 1 month to 11 years (*Table 2*). The median interview duration was 30 mins (range 17–55 mins).

**Table 2.** Participant characteristics (IP = Independent Prescriber)

Participant ID	Practice setting*	Time qualified as an IP	Eye conditions managed in area of prescribing speciality	Approx. no. items prescribed per month, as estimated by participant	Typical consultation length, as estimated by participant	Area of practice (county)
001	Hospital	10 years	Glaucoma	50–100	10–45 mins	Greater Manchester
002	Community (Multiple practice)	1 year	Anterior eye	5–10	25 mins	Greater Manchester
003	Community (Independent practice)	3 years	Anterior eye	2	30–40 mins	Hertfordshire
004	Hospital and community (independent practice)	5 years	Anterior eye and medical retina	100–160	30 mins	Powys
005	Community (Independent practice) and hospital	4 years	Anterior eye and medical retina	8–12	30 mins	Gwent
006	Hospital	4 years	Anterior eye	60	20–30 mins	East Sussex
007	Hospital	5 years	Glaucoma	50–60	20 mins	Greater Manchester
008	Hospital	1 year	Anterior eye and glaucoma	60	20–40 mins	Glamorgan
009	Community (Independent practice)	1 month	Anterior eye	16	30 mins	Gwent
010	Hospital	11 years	Anterior eye and glaucoma	20	20 mins	Glamorgan
011	Community (Independent practice)	9 months	Anterior eye	6	20 mins	Glamorgan
012	Community (Independent practice)	9 years	Anterior eye and glaucoma	400	20 mins	Kent
013	Community (Multiple practice)	<1 year	Anterior eye and glaucoma	20–30	30 mins	Pembrokeshire
014	Community (Multiple practice)	3 months	Anterior eye	0	25 mins	Greater Manchester
015	Community (Independent practice) and hospital	2 years	Anterior eye	100	20–30 mins	Powys
016	Community (Independent practice)	8 years	Anterior eye	8–40	15–25 mins	Glamorgan

\*The practice setting indicates the type of workplace and if community-based, whether this was in an independent practice (i.e., an independently run business, usually a single or small group of practices) or a multiple practice (i.e., a larger-scale business, usually with multiple branches across the UK).

## Themes

Eight themes were generated inductively from the data in the context of factors that influenced independent prescribing by optometrists: (1) Communication and patient education; (2) Confidence and increased experience; (3) Access to schemes and resources; (4) Increased responsibility and lack of remuneration; (5) Wanting the best for the patient; (6) Prescribing guidelines; (7) Perception of role; (8) Continued education.

These themes were then deductively mapped to domains of the TDF and linked to constructs of the COM-B. Results are presented below with the inductive codes presented against each theme, the TDF domain beneath in bold and the COM-B construct in brackets. Further interview quotes are presented in *Table 3*, which also shows the linked intervention functions. Participant ID codes are not presented against each quotation to avoid the identification of any individuals.

### *Theme 1: Communication and patient education*

**TDF domain: Skills** (Capability: psychological).

The most frequently highlighted skill amongst prescribers was the ability to communicate effectively. This was particularly evident in the context of educating patients about their medication, for example, how to administer it and providing an explanation of the treatment and/or condition.

“The patient is then handed the prescription with clear instructions on which drug they’re getting, how they’re to administer it, how many times a day.”

“I think communication is absolutely key. If you’re not going to prescribe, I think you need to talk to the patient about their situation and what other things can be used to help them if it’s not quite at a prescribing level.”

Effective communication was also described as important in instances in which medication was not prescribed, and patients were instructed on how to manage their condition without a prescription; for example, on the use of physical management strategies such as hot compresses or lid hygiene to treat dry eye.

Participants expressed the belief that by communicating with patients and engaging them in treatment decisions, treatment would be more likely to succeed.

“I think that if you’re not getting your patients to engage with the process and actually make an informed choice to whether they want to accept treatment with long term medications. Particularly when there are other availabilities in terms of laser and

surgical options, I think that they definitely should be engaged.”

Furthermore, participants emphasised the importance of adopting an individualised or a holistic approach and the skill of involving patients in treatment decisions.

“For example again, bacterial conjunctivitis and if they’re a teacher and they need to get back to work, yeah you might prescribe antibiotics versus the more conservative approach.”

### *Theme 2: Confidence and increased experience*

**TDF domain: Beliefs about capabilities** (Motivation: reflective).

Those who worked in the hospital eye service expressed the greatest levels of confidence about their prescribing relative to those working in other settings. Typically, the participant attributed their confidence in prescribing to their experience in having managed a large and diverse group of patients. There was an emphasis on drawing upon knowledge from their experience in order to make a prescribing decision. It was common for those that were less confident in prescribing to seek opportunities to gain more experience in places where they would be exposed to a higher patient volume e.g., a hospital eye department in an attempt to build a sense of personal mastery.

“There’s a lot of experience from my own expertise of just having done the job for 20 odd years and kind of thinking ‘I think this is what I’m looking at’ because obviously the first decision is making a decision as to what you’ve got.”

“... So I feel like I could do more and if time allowed me now, I would like to do a hospital placement one day a week.”

Those who were confident in their prescribing decisions expressed an awareness of their ability to seek advice from colleagues/supervisors when needed.

“... Ultimately confidence in my own abilities I would say is high and good but only in the context of a knowledge that I can discuss uncertainty with colleagues.”

More experienced participants felt confident in their own capabilities. There was an acceptance that to be a capable prescriber, it was necessary to have practical experience in treating the condition in question.

“I mean, if you’ve never worked in A&E, never worked in emergency clinic alright? Then how much

competency will you have in managing some of the acute presentations you see? It [confidence] comes down to experience.”

*Theme 3: Access to schemes and resources*

**TDF domain: Environmental context and resources** (Opportunity: physical).

Participants noted how their prescribing was limited by the lack of a professional contract with the hospital in their area or by lack of local professional networks or schemes. It often meant that patients would be issued either a private prescription at their own expense or be redirected through the GP (General Practitioner)/hospital.

There were also cases in which prescribers were restricted by medication supply issues.

“... On the other side, the hindering of prescribing is the lack of NHS [National Health Service] contract in the area that allows us to be able to use the prescribing ability to its full potential.”

“So where I work in the community I don’t bother prescribing just because of the fact that I’ve not got access to any prescription whatsoever.”

“Historically I’ve asked for a drug called Bromfenac for post-op CMO [cystoid macular oedema] but patients have difficulty getting it. So it stings less, it’s a non-steroidal but it stings less for the patient and it works very, very, well. But if the patient can’t get hold of it, I’ve given up asking for it.”

**TDF Domain: Social influences** (Opportunity: social).

Participants emphasised the importance of social influences, within the context of building good relationships with other healthcare professionals, in order to manage patients when the option to prescribe independently is restricted.

“We’re pretty friendly with the GPs here. So we will write to the GP. We’ve got the system which is the ‘Common Ailments Scheme’ which you’re familiar with I guess yeah? So we can ask the chemist to prescribe for us so we can get an antibiotic off the chemist, for instance chloramphenicol or a dry eye treatment”

*Theme 4: Increased responsibility and lack of remuneration*

**TDF domain: Social/professional role and identity** (Motivation: reflective).

Participants expressed concern over how the adoption of the prescribing role increased their workload and increased risk without any financial remuneration. It was emphasised

that optometrists were willing to accept further responsibility in their role for managing patients, but that this must be met with fair remuneration. In some cases, participants described making a conscious decision not to prescribe for certain conditions that could be managed within the scope of local acute eye care schemes by optometrists without an independent prescriber qualification.

“With my job role there’s not really anything in place in terms of payments for follow-ups. So I would have to probably refer a lot of cases just in terms of that rather than my confidence level.”

“You’re always kind of aware of the risks of litigation when you manage something”

One participant expressed the importance of good professional identity within the context of concern about making errors.

“I’m operating at ... a level of a good mid-grade ophthalmologist in my areas of expertise, and I know that any mistakes I make could very easily be made by people in secondary care as well. I suppose the worry for me is you get away with mistakes in secondary care a little bit more easily than you do in primary care. I think this is why having good relationships with ophthalmology is important because you want them to have a respect for you that they’re not going to hang you out to dry if you do make a mistake.”

Holistic care, including the ability to treat a patient’s condition from beginning to end, was a source of satisfaction of the role for most participants. Participants noted that consultations involving difficult discussions around irreversible sight loss tended to leave them feeling as though they wish more could be done for the patient. Despite the difficult nature of the consultations, participants emphasised the importance of professionalism.

“I think when you see the problem through and you see the end result, I think that’s really rewarding.”

“... It’s more really kind of wet AMDs [age-related macular degeneration] and the ones that have got end stage things that you can’t do anything about I find really disheartening.”

“What motivates me? Professionalism, doing the right thing for the patient, getting a good job done just as it does in any other area of optometric practice.”

**TDF domain: Reinforcement** (Motivation: automatic).

The motivation to undertake prescribing was in part contingent on fair remuneration, with the importance of



an appropriate incentive for the additional workload highlighted.

“We’ve just got to make sure that we all practice safely and also that the requirements placed on the optometrist are reasonable, and we are remunerated adequately for it because as soon as you do allow yourself to do more things, your remuneration doesn’t increase and you have to do more CET [continuing education and training] points or more of this, more of that.”

“Funding for the time required I suppose would help us to provide a better service for our patients.”

#### *Theme 5: Wanting the best for the patient*

**TDF domain: Goals** (Motivation: reflective).

A shared sentiment among participants was the desire to improve the patient’s quality of life by minimising the impact of their eye condition on daily activities. This was true among optometrists working with potentially sight-threatening conditions in hospital and those working with minor eye conditions in the community.

“I want to be aiming to have them on treatment for as short a time as possible. And not something that’s going to be a massive inconvenience and be taking up every moment of their day with different drops and different regimes.”

“The goal probably if possible is to make them feel better as quick as we can. And you know, have as little impact on their life as possible really.”

#### *Theme 6: Prescribing guidelines*

**TDF domain: Knowledge** (Capability: psychological), **Beliefs about Consequences** (Motivation: reflective) and **Environmental Context and Resources** (Opportunity: physical).

Knowledge of how to prescribe appropriately had been derived from a variety of guidelines in order to manage their patients including National Institute for Health and Care Excellence (NICE) and The College of Optometrists’ guidelines. The less experienced optometrists favoured the use of these clinical guidelines, whilst more experienced prescribers tended to view the guidelines as too restrictive and emphasised the importance of making prescribing decisions based on their own clinical experience and knowledge.

“I use the College guidelines in order to diagnose properly and I use other resources for that sort of thing as well.”

“I’m also aware that just because the college says it is so, it does not mean that it’s always clinically so. I’ve certainly seen things where the way the hospital would deal with something is not necessarily what the college recommends in their guidelines. That’s all it is. A guideline.”

“As I say with the College of Optometrists guidelines, they can be quite draconian and I think they need to leave it more to the individual clinician to decide where their red lines are.”

Overall, participants frequently adhered closely to The College of Optometrists’ Clinical Management Guidelines,<sup>45</sup> partly as a result of the resource featuring in the syllabus for the qualifying examination. Additionally, participants indicated that deviating from the Clinical Management Guidelines could be detrimental in a fitness to practice hearing.

“... Guided by the Clinical Management Guidelines. Again I mean, I would prescribe basically according to them. Sticking very much closely to it.”

“... In many cases other IP optoms seem reluctant to prescribe certain things or manage certain conditions that they’re probably very capable of doing because they’re worried about the guidelines or worried about getting a fitness to practice situation.”

For some participants, in particular those in a hospital setting, prescribing protocols set by consultant ophthalmologists were available. Participants tended to find these protocols useful in supporting their prescribing decisions.

“I guess things that support it are things like having set protocols in place that sort of encourages prescribing because we’ve got set guidelines to adhere to”

#### *Theme 7: Perception of role*

**TDF domain: Social/Professional role and identity** (Motivation: reflective).

Hospital optometrists tended to view prescribing as essential to their role. The general consensus among participants was that prescribing should and will become a larger part of the role of an optometrist. There was emphasis that independent prescriber optometrists should be utilised more in order to relieve pressure from the hospital eye service. Participants also expressed a need for a greater level of public awareness of the role of independent prescribing for optometrists.

“I think in terms of my role, it’s essential. I don’t think I could fulfil the job I’m expected to do on a daily basis without prescribing just simply because of

the fact that there's so many prescribing decisions to be made.”

“I would say because I'm in a hospital setting and I'm working in ophthalmology clinics a lot of the time. I would say it's [prescribing] a really important part of it.”

“I hope it [the role of an independent prescriber] will increase because I generally think it does help to hospital eye department. Especially I think with the more serious conditions. If you've got the confidence and you're able to take them on you'll definitely relieve a lot of stress and strain off the hospital department”

**TDF domain: Environmental context and resources** (Opportunity: physical).

Currently, in Wales and Scotland, community-based independent prescriber optometrists can issue NHS prescriptions without financial cost to the patient at the point of use. However, in England and Northern Ireland, independent prescriber community optometrists must issue private prescriptions, which incur financial cost to the patient. Community-based optometrists described restrictions on resources as a barrier to their prescribing.

“Sometimes it's quite difficult because what we're having to give is private prescriptions. . . . My prescribing decision is hindered by the fact that they're then going to have to pay a lot of money for it”

“... If you write a private prescription, then ... the customer's got the cost of the private prescription and the cost of the drug ...”

“... So you'd have to do private prescriptions which would mean that patients have to pay a private fee and it's just not really going to be something that's an option for most of the patients that are looked after in the community”

#### *Theme 8: Continued education*

**TDF domain: Knowledge** (Capability: psychological) and **Social influences** (Opportunity: social).

In practice settings with more than one independent prescriber optometrist, it was typical to engage in peer review sessions, which were described as greatly beneficial. For those working alone, there was a feeling that more could be done to support their learning. Prescribing tended to be used less frequently by community optometrists, and the need for additional learning resources such as monthly case studies was suggested. Participants expressed a desire to expand on their knowledge of specific eye conditions, but

the current professional educational events were described as too broad and infrequent to support this expansion.

“... Example cases that would come out once a week or once a month from the College on independent prescribing. Something like that would be really useful so you can build up a case series and keep it in a folder or you know, you can refer back to it. Something like that would be brilliant.”

“It would probably be more useful to have kind of day courses specifically in one area of prescribing at a time. So you're actively choosing 'I'm going to go and learn more about prescribing glaucoma medication' or 'I'm going to go and learn more about prescribing steroids' ...”

Participants viewed informal discussions, with other independent prescriber optometrists around prescribing decisions, as essential. Participants emphasised the importance of learning from each other in order to maintain and expand their skills.

“... As well as that, I speak to peers and other colleagues on a more informal basis. Not necessarily on the day but you know, a week or two later or a few weeks later just to keep myself- So it's a bit like calibrating oneself to make sure that you're on the right lines.”

#### **Intervention functions**

The outcome of the mapping of the qualitative data identified that an intervention should perform the functions of education, persuasion, training, modelling and enablement.

#### **Discussion**

##### **Statement of principal findings**

To our knowledge, this is the first study to use a theoretical framework to identify the factors that influence prescribing behaviour by optometrists. Eight themes were identified including: (1) Communication and patient education; (2) Confidence and increased experience; (3) Access to schemes and resources; (4) Increased responsibility and lack of remuneration; (5) Wanting the best for the patient; (6) Prescribing guidelines; (7) Perception of role; (8) Continued education. Within these, 11 of the 14 TDF domains were found to influence this behaviour based on initial inductive content analysis. Memory, attention and decision making (remembering what to do and how to do it), alongside optimism (being optimistic of the outcomes) and behavioural regulation (ability to plan to do it) were not highlighted within the core themes.

**Table 3.** Further quotes within themes, mapped to Theoretical Domains Framework (TDF) domains

Theme	TDF domain	Examples of interview quotes	COM-B construct	Linked intervention functions
1. Communication and patient education	Skills	<p>"Communication. So it's getting the right information from the patient. I think you've got to be calm because you don't want to be jumping to conclusions. You've got to have the ability to look at things objectively but also not be too... Make sure you're good at excluding as well as including diagnoses."</p> <p>"It's about communication with the patient. That's the most important thing."</p> <p>"...discussion with the patients primarily, and giving them all the options. So this is what we could do, these are the options. and this is what we could do if you don't prescribe. and this is how we can manage it conservatively. And help them make a decision or allow them to make their own informed choice"</p>	Capability (psychological)	Education Training Enablement
2. Confidence and increased experience	Beliefs about Capabilities	<p>"the more exposure I get to more different conditions, once I start prescribing for them and doing it repeatedly, then I become more confident in it."</p> <p>"...if I weren't sure I could go and ask. There's always an opinion somewhere if you need one."</p> <p>"it's a huge sort of reassurance in that when somebody comes and says yeah, you're right and that informs you and it means the next time you make a decision. You feel more confident, again, you build trust."</p> <p>"I feel like I would be happy to manage things that maybe others might not. Like for example, there is another optometrist in the practice that does MECS [Minor Eye Care Scheme] and something like a deep abrasion, I'm happy to manage that"</p>	Motivation (reflective)	Education Persuasion Incentivisation
3. Access to schemes and resources	Environmental context and resources	<p>"...generally speaking it [relationship with hospital] has always been pretty good. And you know, they're on the same page as us. They don't want to see them if they don't have to"</p>	Opportunity (physical and social)	Environmental restructuring Enablement Training Modelling
4. Increased responsibility and lack of remuneration	Social/prof role and identity  Reinforcement	<p>"I could technically manage ocular hypertension and glaucoma suspects independently of ophthalmology. However, there's no funding mechanism to allow that and there's no funding mechanism to allow for these patients to be discharged to me in primary care to do stuff I could do at the moment, which will take patients out of the hospital"</p> <p>"... we are taking on more responsibility for no more pay and you don't get any more than you would for an EHEW [Eye Health Examination Wales, emergency eye care] examination that you're going to refer in anyway"</p>	Motivation (reflective)  Motivation (automatic)	Persuasion Incentivisation  Environmental restructuring

(continued)

Table 3. (continued)

Theme	TDF domain	Examples of interview quotes	COM-B construct	Linked intervention functions
5. Wanting the best for the patient	Goals	"Basically we're trying to minimise any kind of impact on the patient. And so the travel time, making the whole patient journey easier so they're not having to go backwards and forwards between the practice and the surgery and the pharmacy, so they're not being pushed around. So it's about making the patient journey as easy as possible."	Motivation (reflective)	Education Persuasion Incentivisation
		"It's really thinking about the patient and what is best for the patient. And so I think that's always got to be at the forefront, is making sure that you get a good outcome for your patient."		
		"Really the whole motivation behind that should be to make a difference to people's lives. And if I've done that then that's quite satisfying, yeah."		
6. Prescribing guidelines	Knowledge	"I've come across one or two patients before who refused glaucoma treatment and just very happily accepted that they were going to lose their eyesight over the next however many years and emotionally yeah, that's tough because I think it's frustrating and it's disappointing and it's worrying and part of me feels like, have you done a good enough job of explaining the risks to them"	Capability (psychological)	Education Training Enablement Education
	Beliefs about Consequences	"The only reference guide I have, two reference guides I have are the BNF and the College guidelines. And they support me quite a lot I think, in that they've kind of helped me if I'm confident in my diagnosis, I normally find the treatment within the CMGs"	Motivation (reflective)	
	Environmental Context and Resources	"It could become quite serious if the patient doesn't adhere or comply to the prescribed drugs and then are you responsible because you haven't given them written information? Does insurance cover their lack of adherence and compliance? And you know, how are you monitoring the patient's ability to comply and adhere to your medication. That's a difficult one because it might not be your fault but it is your fault because you've chosen to manage"	Opportunity (physical)	Training Environmental restructuring Enablement Education Persuasion Incentivisation
7. Perception of role	Social/professional role and identity	"So if you follow those clear clinical management guidelines, you're not going to be too badly criticized if something goes wrong. So if I'm uncertain, I would look at the guidelines because if you're being sued, that's what they're going to look at. "Why didn't you do this?"	Motivation (reflective)	Education Persuasion Incentivisation Training Environmental restructuring Modelling Enablement Education Training Environmental restructuring Modelling Enablement
	Environmental Context and Resources	"I see it [prescribing] as something that has just sort of absorbed into my daily work"	Opportunity (physical)	
8. Continued education	Knowledge	"The biggest sort of observation I suppose is the fact that up until fairly recently it's been very hard to get access to a prescription pad. You think well I'm allowed to prescribe but I can't prescribe on the NHS..."	Opportunity (physical)	Education Training Environmental restructuring Modelling Enablement Education Training Environmental restructuring Modelling Enablement
	Social influences	"I think there should be some element of mandatory case discussion, CPD, continuing professional development"	Capability (psychological) Opportunity (social)	Education Training Environmental restructuring Modelling Enablement
		"It's something that the GOC don't recognize in terms of CET points. Actually, you get CET points for attending some lecture and you get a therapeutic point. I learned the most about therapeutics discussing day in, day out with colleagues, some point missed by our, if you like our regulator in terms of how education for optometry should be structured."		
		"I've also taken a lot of learning over the years from conversations with ophthalmologists"		

Findings highlight the need for good communication skills (TDF domain: Skills, COM-B: Capability) and sufficient education (TDF domain: Knowledge, COM-B: Capability) and experience (TDF domain: Beliefs about capabilities, COM-B: Motivation) in order to be able to prescribe appropriately. Additional important influences on prescribing behaviour were networks and relationships with other healthcare professionals (TDF domains: Social influences, COM-B: Opportunity), the perception of the behaviour within the job role (TDF domain: Social/professional role and identity, COM-B: Motivation), appropriate structure for remuneration (TDF domain: Reinforcement, COM-B: Motivation; TDF domain: Social/professional role and identity, COM-B: Motivation) and the understanding (TDF domain: Knowledge, COM-B: Capability) and provision of professional guidelines (TDF domain: Environmental context and resources, COM-B Opportunity). Awareness of and access to these guidelines not only facilitated prescribing decisions, but influenced perceived outcomes (TDF domain: Beliefs about Consequences, COM-B: Motivation), and were seen as a safety net in relation to litigation. Overall, there was a clear goal (TDF domain: Goals, COM-B: Motivation) to prescribe where appropriate to optimise patient outcomes, and it was acknowledged that confidence to do so was an important factor (TDF domain: Beliefs about Capabilities, COM-B: Motivation). 'Goals' and 'Intentions' are separated as domains in the TDF, with goals highlighting an end state seen as a preferred outcome, and intention considered to be the motive to undertake a behaviour.<sup>39</sup> However, the two are often linked by the assumption that the strength of an individual's intention determines their respective effort to set and achieve a goal.<sup>46</sup>

### Comparison with other studies

The determinants of behaviour we identified align with previous findings from studies of nurse prescribers. The importance of strong interpersonal communication skills reported in this study resonate with findings from previous studies of nurse prescribers.<sup>24,36</sup> We described the important influence of relationships with other healthcare professionals, which is also consistent with that found by previous studies of nurse prescribers.<sup>37,47,48</sup> Wanting the best for the patient, identified as a determinant of behaviour in our study, was also found in previous research with nurse prescribers using the TDF.<sup>36</sup>

Participants in the present study highlighted the difficulties for patients with respect to the structures governing the cost of medicines to the patient, and expressed the need for fair professional remuneration. Similarly, lack of remuneration was cited as a major barrier to prescribing in a previous survey of optometrists.<sup>31</sup> Participants in the current

study reported that the increased responsibility of making prescribing decisions with regards to managing patients, sometimes with more complex conditions, and in the context of associated risks of the medications prescribed, was sometimes incompatible with the business aspects of optometric practice; analogous to the findings amongst pharmacy prescribers.<sup>49</sup> Additionally, the importance of good professional identity recurred in our findings (Themes 4 and 7). Although prescribing decisions increased the level of responsibility, they were felt to be essential to the professional role.

Although participants were active in seeking out opportunities to gain further experience with continuing education and prescribing, they highlighted the need for continuing professional education that was more specific to prescribing. Those who prescribed fewer items identified the need to gain further clinical placements. Similar to these findings, nurse prescribers were previously reported as desiring to keep their knowledge and skills up to date to ensure their capability to prescribe.<sup>36</sup> Additionally, surveys of optometrists have identified a lack of continuing education opportunities as a barrier to prescribing,<sup>31</sup> with optometrists in favour of regular training.<sup>33</sup>

### Strengths and Limitations

The main strength of this study is the systematic and structured approach to defining and specifying, in behavioural terms, the problem of implementing prescribing by optometrists. The use of a theory-driven approach to identify influences on prescribing behaviour is another strength. Furthermore, the findings can be used as the basis for development of a theoretically informed intervention to support prescribing by optometrists.

Interviews were undertaken iteratively. Although the sample size was small, it is consistent with models of qualitative research,<sup>42</sup> with no new data relevant to the themes being found in the latter interviews, which suggests data saturation.<sup>43</sup> However, random sampling was not used. Purposive and snowball sampling of participants was used, which may have introduced selection bias, in that participants who volunteered to take part in the study may have been more motivated towards prescribing. Given the geographical limitation of the sample, the results may not be representative of the breadth of experience with respect to the wide variation in schemes and scope of practice across and within the devolved nations in the UK.

Less motivated prescribers may have additional deterrents and other views that were under represented in this sample that should also be seen as a limitation. Participants were encouraged to arrange interviews at a time and place most convenient to them, with most interviews occurring

at workplaces. This factor may have affected participants' responses due to time constraints.

### Meaning of the study: possible explanations and implications for clinicians and policy makers

Our findings provide an evidence base for the development of a theoretically informed intervention to support prescribing by optometrists. The intervention functions identified from the data indicated that an intervention strategy should use the functions of education, persuasion, training, modelling, enablement, incentivisation and environmental restructuring. Such an intervention can be developed using the system mapping approach of the Behaviour Change Wheel, with a view to increase the number of prescriptions issued by optometrists in place of those issued by a GP or another healthcare professional and/or increase the number of consultations. Future interventions should consider the redesign of optometrist-led eye care services (environmental restructuring) to allow equality of patient access to NHS funded prescriptions across the UK. Further environmental restructuring could see the allocation of funding, to ensure appropriate remuneration for optometrists, which reflects the increased workload and level of responsibility of independent prescribing. These examples relate to our findings of difficulties for patients with respect to the structures governing the cost of medicines (TDF domain: environmental context and resources) and for optometrists with respect to remuneration (TDF domains: social/professional role and identity; reinforcement). Other interventions include increasing public and inter-professional awareness of prescribing optometrists' contribution to eye care services, via education and training, as well as increasing access to clinical placement experience providing greater opportunity and formalising continuing professional development.

The findings can also be used by practitioners to identify their individual influencers on prescribing decisions. Policymakers and researchers will need to consider the influencers of prescribing identified in this study and the identified components of an intervention before designing an acceptable implementation intervention.

### Unanswered questions and future research

Although further exploration is required involving specific questioning on differences between the needs of optometrists working in primary and secondary care, some differences were noted in the present study. Hospital-based optometrists expressed the greatest levels of confidence in prescribing relative to community optometrists and were more likely to view making prescribing decisions as

essential to their role. Differences in environmental restrictions were observed, with those in the community more likely to experience this as a barrier to prescribing. Community-based optometrists highlighted the importance of good relationships with the local GP. Both groups shared a strong desire toward improving the quality of life for their patients.

We have identified theory-derived influences on prescribing by optometrists. The next step is to use our findings to develop a structured intervention, based on the intervention components identified, such as a support package to help facilitate prescribing, and then to test the feasibility of this theory-based intervention and whether it results in lasting changes to prescribing behaviours.

### Conclusion

Given the increasing numbers of independent prescriber optometrists, it is important that these findings are used to inform theoretically grounded interventions to support prescribing behaviour by these groups. In the context of healthcare quality improvement, the potential social and economic ramifications of such interventions include improved patient experience and cost savings. This research will be of interest to those countries in which prescribing by optometrists is established or in the process of becoming established.

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### Author contributions

**Daniel Spillane:** Data curation (equal); Formal analysis (equal); Investigation (equal); Methodology (equal); Project administration (equal); Software (equal); Writing-original draft (equal); Writing-review & editing (supporting). **Molly Courtenay:** Conceptualization (equal); Formal analysis (supporting); Investigation (supporting); Methodology (equal); Supervision (equal); Writing-review & editing (equal). **Angel Chater:** Formal analysis (supporting); Methodology (supporting); Validation (supporting); Writing-review & editing (supporting). **Hannah Family:** Formal analysis (supporting); Methodology (supporting); Validation (supporting); Writing-review & editing (supporting). **Angela Whitaker:** Data curation (supporting); Investigation (supporting); Methodology (supporting); Project administration (supporting); Supervision (supporting); Writing-review & editing (supporting). **Jennifer H Acton:** Conceptualization (lead); Data curation (supporting); Formal analysis (equal); Investigation (lead); Methodology

(lead); Project administration (equal); Resources (lead); Software (equal); Supervision (lead); Writing-original draft (supporting); Writing-review & editing (lead).

### Conflict of interest

The authors report no conflicts of interest and have no proprietary interest in any of the materials mentioned in this article.

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