# **Title page**

**The emerging norms of e-cigarette use among adolescents: a meta-ethnography of qualitative evidence**

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**Title**

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**Abstract**

While qualitative research has indicated that adolescents’ motivation for e-cigarette use is different than adults’, this body of literature has not yet been brought together and synthesised. We reviewed qualitative evidence on perceptions and uses of e-cigarettes in order to explore the emerging norms of vaping among adolescents. We searched five databases for qualitative research in October 2019 with no restrictions on date of publication or data collection. We identified fifteen papers from thirteen studies. Using a meta-ethnographic approach, we identified a spectrum of descriptive and injunctive norms of vaping across the themes of addiction; perceptions of comparative harm; parental perceptions and peer perceptions. We found addiction and perceptions of comparative harm to reflect descriptive norms, while we found clearer evidence explaining the use and non-use of e-cigarettes through parental and peer approval of vaping. However, these norms were fluid, diverse and sometimes contradictory. This review provides a resource for researchers, policymakers and practitioners to better understand the ways that emerging norms could be influenced through policy and practice.

**Key words**

E-cigarettes, vaping, smoking, social norms, qualitative research, systematic review

**Introduction**

While countries such as the UK and US have seen recent declines in youth tobacco smoking (ASH, 2019b; CDC, 2020), rising use of nicotine containing electronic cigarettes (henceforth e-cigarettes) among youth is perceived as a growing public health concern (ASH, 2019a; U.S. Department of Health and Human Services, 2018). Recent figures from the US demonstrate that, while e-cigarette use has declined since 2019, 3.6 million adolescents (4.7% of middle school and 19.6% of high school students) were using e-cigarettes in 2020 (Wang et al., 2020). Data from the UK shows that e-cigarette ever use among adolescents rose from 15.4% to 16% between 2018-2019 (ASH, 2019a). However, while more youth might be experimenting with e-cigarettes in the UK, regular use is low (1.6%) and occurs mainly among existing cigarette smokers (McNeill et al., 2019).

Youth nicotine use has always been an area of acute concern due to the possibility of developing addiction and the potentially negative effects of nicotine on adolescent brain development (England et al., 2015; Klein, 2015). Consequently, the US Surgeon General has described the increase in e-cigarette use among youth as an ‘epidemic' (U.S. Department of Health and Human Services, 2018), with the Food and Drug Administration (FDA) recently announcing action to remove flavoured e-cigarette cartridges, that appeal to youth, from the US market (U.S. Department of Health and Human Services., 2020). In the UK, the EU Tobacco Products Directive (TPD) includes legislative changes to reduce youth exposure to e-cigarettes (Brown et al., 2020).

E-cigarettes have seen debates around tobacco harm minimisation and prevention intensify. For example, concerns exist that an increase in e-cigarette use among youth could lead to, and renormalise, tobacco cigarette smoking (Brown et al., 2020; Measham et al., 2016) and resultantly reverse the decline in smoking amongst youth (Chapman et al., 2019). However, others have argued that an association between e-cigarette use and subsequent smoking can be explained by ‘common liabilities’, where it is contended that vaping adolescents would smoke regardless of e-cigarette initiation (Etter, 2018). Further disagreement exists in relation to the promotion of e-cigarettes for harm minimisation and cessation among smokers and whether a more restricted and precautionary approach to vaping should be adopted until the longer term health impacts are fully understood (Green et al., 2018).

These debates are reflected in the general diversity of e-cigarette regulation globally, with policies ranging from outright or partial bans to regulation of nicotine content and minimum age of sale (Klein et al., 2020). However, as Klein et al. (2020) note, regulation that only targets one area is unlikely to be effective in reducing youth e-cigarette uptake. Instead, a comprehensive regulatory approach is advocated in order to strike a delicate balance between restricting access to nicotine products among nicotine-naïve adolescents while ensuring the availability of alternative nicotine products for established smokers (Klein et al., 2020; Sindelar, 2020). In order to successfully achieve such a balance, policy-makers need a better understanding of the social context in which e-cigarette use takes place; an area where qualitative research is limited, even in relation to more conventional tobacco products (Papanastasiou et al., 2019).

Research has indicated that adolescents’ motivation for e-cigarette use is different than adults, who generally use e-cigarettes for cessation or harm reduction while controlling nicotine intake (ASH, 2020; Patel et al., 2016). For adolescents, the attraction of e-cigarettes may instead relate to new social practices of vaping (Tokle, 2020) and its association with fun, discreet use, the performance of vapour tricks and flavour experimentation (Evans-Polce et al., 2018; Kong et al., 2015; McKeganey & Barnard, 2018). More long-standing research on the differences between adolescents’ and adults’ nicotine/tobacco use suggests adolescents place greater emphasis on social aspects than concerns about health and addiction (Amos, 2005; Vu et al., 2019).

While recent qualitative research has increased understandings of vaping among adolescents, there is no overall synthesis of perceptions and use. Therefore, this study conducted a meta-ethnography of qualitative research on adolescent e-cigarette perceptions and use. Rather than summarising the findings of qualitative research, meta-ethnography involves translating findings across and between studies to produce new insights or interpretations that were not evident in the original studies (Thomas & Harden, 2008).

We use a social norms framework to explore common and accepted attitudes, understandings and behaviours in the context of e-cigarettes and vaping (Mead et al., 2014). Descriptive norms, which indicate the prevalence of a phenomenon, and injunctive norms, which indicate approval or disapproval of a behaviour, can be particularly useful for interpreting qualitative e-cigarette research (Alexander et al., 2019; Camenga et al., 2018). For example, finding an awareness of increased vaping among young people might be an example of a descriptive norm but it does not reveal anything about attitudes towards this behaviour, that are in the domain of injunctive norms. This framework therefore facilitates exploration of both perceptions and use practices among a mix of regular, ever and never e-cigarette users across varied study contexts. The framework also has relevance for policies targeting adolescent e-cigarette use, as descriptive and injunctive norms have been shown to predict nicotine and tobacco use behaviours (Mead et al., 2014). Further, research has demonstrated that policies targeting both descriptive and injunctive norms are effective in influencing attitude and health behaviour change (Rhodes et al., 2020; Rimal & Lapinski, 2015; Shulman et al., 2017). Therefore, this study undertook a meta-ethnography of qualitative research to consider both patterns and (dis)approbation of e-cigarette use among adolescents (under 18 years).

**Methods**

A full protocol of this review is registered with PROSPERO (ID: CRD42020182168). This review is reported in line with PRISMA guidelines (Moher et al., 2009) (Supplementary file).

Search strategy

Using terms for e-cigarettes and qualitative research (Supplementary file), the following five electronic databases were searched on 14th October 2019: EBSCO, ProQuest (and ProQuest ASSIA), Web of Science (Core Collection, SciELO, Biosis), PubMed and Cochrane Library. Hand searches were also conducted in relevant journals but found no further studies. An initial 3,094 papers were identified.

Study selection

Once duplicates were removed, studies were included at title and abstract screening if they were empirical, qualitative, peer reviewed and focussed on lay use or perceptions of e-cigarettes. HS conducted the title and abstract screening and identified 114 studies. A sample of 25% of excluded papers were screened by ML and a further 60 studies were screened by all authors. Two papers were later excluded as there was no English language version of the full text.

The 112 papers for full text review were split by age into 2 categories: adolescent (under 18, n=27) and adult (18 and over; reported elsewhere, n=85). For the 27 adolescent papers (Supplementary file), further criteria were applied at full text review. Studies that did not use in-depth qualitative methods (e.g. written message analyses) were excluded (Cavallo et al., 2019), since the depth of data was limited for exploring vaping norms. Since this review explores vaping norms among adolescents, studies were also excluded if participants were children (under 10 years) (Faletau et al., 2013). In line with Cancer Research UK's Code of Practice on Tobacco Industry Funding (Cancer Research UK, 2015), studies funded by tobacco companies and/or e-cigarette companies were also excluded at this stage (McKeganey & Barnard, 2018).

Studies were also excluded where the available amount and/or quality of data was insufficient for a meta-ethnography. This included studies with limited data specific to participants aged under 18 (Akre & Suris, 2017; Antin, Hess, et al., 2019; Antin, Hunt, et al., 2019; Kim & Lee, 2017; Romijnders et al., 2019; Rooke et al., 2016; Sakuma et al., 2019; Satghare et al., 2018). Similarly, studies that classed participants as ‘young people’ with ages spanning from adolescence to adulthood, and did not specify the age of participants in the presentation of data, were excluded since data from participants under 18 years could not be identified (Measham et al., 2016).

The full text review was conducted by HS and regular meetings with all authors checked samples of remaining papers and refined the inclusion/exclusion criteria. Fifteen papers (relating to 13 studies) published between November 2013 – September 2019 met the inclusion criteria (Figure 1). Of these, five papers (Camenga et al., 2015; Lucherini et al., 2018, 2019; Peters et al., 2013; Wagoner et al., 2016) included participants aged 18+, however data from participants aged 18 and over in these papers has not been included in the analysis.

*<Figure 1 to appear here>*

**Figure 1:** PRISMA flow diagram (databases were searched in October 2019 with no restrictions on publication date or data collection period).

Quality appraisal and data extraction

Quality appraisal criteria were created based on the CASP guidelines for qualitative research (Critical Appraisal Skills Programme, 2013). This included the study focus, suitability of the research design, participant recruitment, methodology, analysis, study limitations, and ethical considerations (Supplementary file). All studies were appraised as having adequate quality for inclusion in the review. While no studies were considered high quality, this was not a reflection of their general quality but related specifically to the value studies added to the review in terms of the norms of vaping. Data were extracted using a form that was developed and piloted for the review, which included: study design, location, participant characteristics, study period, study size, method of data collection and analysis, and theoretical frameworks. Text was also entered in the form summarising the study’s main findings relevant to the review. Data were extracted by HS and checked by ML. All other authors reviewed the data extraction and quality appraisal forms.

Data analysis

A meta-ethnographic approach was used for data analysis and synthesis (Noblit & Hare, 1988). This involves translating findings and concepts across and between studies to result in a new interpretation of the individual studies (Thomas & Harden, 2008). The meta-ethnographic process started with an in-depth reading of the studies. This was followed by coding the findings and discussion/conclusion sections of each study in NVivo 12. Here, first order codes (participant quotes and direct summaries of participant data) and second order codes (author interpretations of participant data) were analysed separately. Descriptive themes were then developed by ‘translating’ the first and second order codes into one another (Thomas & Harden, 2008). Our understandings of the first and second order codes generally matched those of study authors’. The last stage of the meta-ethnography involved creating analytical codes from the descriptive codes that ‘went beyond’ the findings of the original studies (Thomas & Harden, 2008).

To achieve this, we coded the data to identify the potential approval or disapproval of e-cigarette use. Shulman et al. (2017) note that descriptive norms (those relating to the prevalence/frequency of beliefs and attitudes) and injunctive norms (those which show what people believe is socially acceptable) are often conflated, and so the potential for descriptive norms to influence behaviour is often overstated. Our coding of injunctive norms is relatively simple but provides a practical approach to tease out the perceptions and uses of e-cigarettes across varied studies. To provide clarity regarding the normative processes being formed through the proliferation of e-cigarettes, we deduced injunctive norms from our initial coding that suggested either the approval or disapproval of e-cigarettes and vaping.

**Results**

Study summary

Fifteen papers from 13 studies were included in the review. Papers that reported findings from the same study were considered as one overall study (Table 1). The majority of studies were from the US (n=8), followed by the UK (n=4) and Canada (n=1). This highlights a lack of diversity in in-depth qualitative research exploring e-cigarette use and perceptions among adolescents in countries beyond the UK and US. Most studies (n=11) used focus groups, which are often employed in research involving adolescents, as they can make young people feel more comfortable in research encounters (Kellett, 2011) and have been used widely for exploring perceptions, beliefs and experiences in health research (Adler et al., 2019). The high number of studies using group methods demonstrates that this review is based on relevant data for exploring emerging norms, uses and perceptions of e-cigarettes among adolescents. While the studies included a range of regular, ever and non-e-cigarettes users, as well as smokers and non-smokers, the ways in which data was presented in papers meant it was not always possible to determine whether norms differed between groups by smoking and/or vaping status. However, where possible, we do distinguish participant vaping status, and when quotes are used, we note participant age and country.

We identified four overall themes comprising relevant elements of emerging injunctive norms that influence e-cigarette uptake and practices: understandings of addiction; perceptions of harm from e-cigarettes; parental perceptions; and peer perceptions. We coded these themes as descriptive norms where data implied that adolescents demonstrated a general awareness of an issue relating to e-cigarettes, but did not indicate clear approval or disapproval. Where data implied identifiable reasons why adolescents were approving or disapproving of e-cigarettes, we coded these themes as injunctive norms. However, the coding of different types of emerging norms was not a straightforward process since the mechanisms of approval and disapproval evident in these data were fluid and sometimes contradictory. We therefore took account of the balance of evidence in designating each norm as either descriptive or injunctive, and in placing injuctive norms on a spectrum from approval to disapproval (Figure 2).

We present each theme in turn together with the evidence for its designation as a descriptive or injunctive norm indicating the approval or disapproval of e-cigarettes and vaping among adolescents.

*<Table 1 to appear here>*

**Table 1:** Included studies.

*<Figure 2 to appear here>*

**Figure 2:** Spectrum of approval and disapproval of e-cigarette use, alongside descriptive and injunctive norms, among adolescents. From left to right the evidence for approval or disapproval is greater and so represent greater injunctive norms.

## Understandings of addiction

Mixed understandings and perceptions of nicotine and addiction were evident across studies. Some participants were knowledgeable about nicotine and e-cigarettes (Alexander et al., 2019; Camenga et al., 2015; de Andrade et al., 2016; Hammal & Finegan, 2016; Hilton et al., 2016; Park et al., 2019; Roditis et al., 2019; Wagoner et al., 2016), commenting on the different levels of nicotine available in e-liquids and nicotine’s addictiveness: ‘there’s only nicotine, there’s no tar [in e-cigarettes]’ but ‘you can still get addicted’’ (13-16, UK) (de Andrade et al., 2016, p. 291). Alongside this, while some participants understood that nicotine is addictive, they were unsure of what addiction meant, as noted by an ever-vaper: ‘if you say something's addictive, you also have to say why being addicted to it is bad’ (12-14, US) (Roditis et al., 2019, p. 4). However, others with a range of vaping status perceived e-cigarettes as less addictive or not addictive at all (Chen et al., 2019; Hammal & Finegan, 2016; Hilton et al., 2016; Park et al., 2019; Wagoner et al., 2016): ‘he [participant’s brother] told me that is, that is not as much tobacco in it than a regular cigarette. And it's not, it don’t have that much stuff in it that makes it as addicted, I mean, as addictive, as smoking regular cigarettes’ (12, US) (Park et al., 2019, p. 87). Adolescent discussions of addiction were weighted towards descriptive norms; i.e, the sense that something was prevalent but not sufficiently connected to an injunctive norm to indicate approval or disapproval.

## Perceptions of harm from e-cigarettes

Many studies reported that participants felt that there were unknown risks and harms associated with e-cigarettes (Alexander et al., 2019; de Andrade et al., 2016; Hammal & Finegan, 2016; Hilton et al., 2016; Kirkcaldy et al., 2019; Lucherini et al., 2018; Park et al., 2019; Roditis et al., 2019; Wagoner et al., 2016; Weishaar et al., 2016). Participants discussed being cautious of e-cigarettes because of the mixed messages and lack of sustained research over time (Alexander et al., 2019; de Andrade et al., 2016; Hammal & Finegan, 2016; Hilton et al., 2016; Park et al., 2019; Roditis et al., 2019; Wagoner et al., 2016; Weishaar et al., 2016):

I don’t think they’re safe, there’s not really any study showing what the vapour like and what’s in it. What kind of chemicals…you never know what you’re smoking. It’d be just water vapour but it could have something (17, Canada) (Hammal & Finegan, 2016, p. 964).

Relatedly, some participants expressed concerns about second-hand vapour and the potential harms to children (Hammal & Finegan, 2016; Hilton et al., 2016; Kirkcaldy et al., 2019; Lucherini et al., 2018; Park et al., 2019; Weishaar et al., 2016):

I think it is still unknown so I don’t think it’s good for people to smoke [vape] these e-cigarettes around like other people who will inhale it (17, UK) (Hilton et al., 2016, p. 4).

I think it's good if people are using these but it's not good for children to see them doing it. ‘Cause it's still a bad habit, even if it's not as bad as smoking (16-17, UK) (Kirkcaldy et al., 2019, p. 161).

Participants discussed wanting, and searching for, credible factual information about the harms and risks of e-cigarettes on the internet (Chen et al., 2019; Park et al., 2019; Roditis et al., 2019): ‘I actually tried researching websites. And everything was different. I was being told it was worse. I was being told it was better. I'm like - so I just don't know what to believe anymore’ (15, US) (Park et al., 2019, p. 88). Therefore, many participants across studies reported on the unknown and potential risks and harms associated with e-cigarette use. However, this did not seem to be an overarching indication of explicit approval or disapproval. Instead, approval and disapproval for e-cigarette use was discussed more clearly in the context of harm in comparison to conventional cigarettes.

The perception that e-cigarettes were less harmful than cigarettes was evident in most studies (Alexander et al., 2019; Camenga et al., 2015, 2018; Chen et al., 2019; de Andrade et al., 2016; Hammal & Finegan, 2016; Hilton et al., 2016; Kirkcaldy et al., 2019; Park et al., 2019; Peters et al., 2013; Roditis et al., 2019; Wagoner et al., 2016; Weishaar et al., 2016). Participants often discussed ‘water vapour’ being less harmful than second-hand cigarette smoke and e-cigarettes containing less chemicals (Chen et al., 2019; de Andrade et al., 2016; Hammal & Finegan, 2016; Hilton et al., 2016; Kirkcaldy et al., 2019; Park et al., 2019; Peters et al., 2013; Wagoner et al., 2016):

I don’t see any risk; I heard that they’ve said it is water, so there’s no risk to it (17, Canada) (Hammal & Finegan, 2016, p. 965).

It is healthier than smoking a cigarette because cigarettes gots all those chemicals in the sh— (16-17, US) (Peters et al., 2013, p. 303).

…you can walk past them and it won’t harm you as much as the real cigarette will (13-16, UK) (de Andrade et al., 2016, p. 292).

The above quotes demonstrate that adolescents, irrespective of their smoking or vaping status, were aware of the harms of tobacco cigarettes, but perceived e-cigarettes as something less harmful or even harmless. Similarly, some participants also discussed e-cigarette use in the context of ‘feeling less guilty’ (Hammal & Finegan, 2016, p. 964) or doing something that is better for you than smoking. While the perception that e-cigarettes were less harmful than cigarettes was evident in most studies, some participants noted that they would stop using or would not use e-cigarettes if they found out they were harmful (Alexander et al., 2019; Roditis et al., 2019; Wagoner et al., 2016), highlighting the fluid nature of these perceptions and their potential to evolve.

The studies suggested that marketing may have been contributing to this perception of e-cigarettes. While some participants in studies were critical of the motives behind the positive messages conveyed in marketing (Park et al., 2019; Wagoner et al., 2016), authors of papers often noted that participants rarely disputed the credibility of sources (Chen et al., 2019; de Andrade et al., 2016; Hilton et al., 2016). For example, several participants cited social media, marketing and advertisements of e-cigarettes as their source of information about the harms of e-cigarettes (Chen et al., 2019; de Andrade et al., 2016; Hilton et al., 2016; Park et al., 2019; Wagoner et al., 2016):

I’ve seen one TV ad. It was talking about how and when you smoke regular cigarettes and how bad the second-hand smoke [is]. But since it is just vapor, you don’t have to worry about that (12-17, US) (Chen et al., 2019, p. 8).

De Andrade et al. (2016, p. 293) also note that participants in their study (13-16, UK) seemed to accept messages portrayed in e-cigarette marketing which had a ‘limited relationship to an increasingly contradictory evidence base and media reports’. Therefore, for some adolescents, perceptions of vaping as less harmful were being formed through social media, marketing and advertising. The evidence suggests that perceived harm from e-cigarette use, especially in comparison to conventional cigarettes, was more clear to adolescents than perceived addiction, when it came to forming decisions on approval and disapproval. However, the weight of evidence for perceived approval or disapproval was fairly evenly split, and we did not identify a common consensus that suggested a clear injunctive norm. The findings in this section potentially reflect a confusion that exists among adolescents as a consequence of the mixed communication on the harms and risks of vaping (Morphett et al., 2020). Indeed, many of the included studies concluded with recommendations for clearer messaging on the relative harms of e-cigarettes (Alexander et al., 2019; Camenga et al., 2018; Chen et al., 2019; Hammal & Finegan, 2016; Kirkcaldy et al., 2019; Park et al., 2019; Roditis et al., 2019; Wagoner et al., 2016; Weishaar et al., 2016).

## Approval and disapproval from parents and authority

### *Cessation and alternative nicotine use*

Participants from several studies were aware that e-cigarettes can be used for smoking cessation (Camenga et al., 2015; Chen et al., 2019; de Andrade et al., 2016; Hilton et al., 2016; Lucherini et al., 2019; Park et al., 2019; Wagoner et al., 2016), with some discussing friends and family members (successful and unsuccessful) experiences of using e-cigarettes for cessation (Camenga et al., 2015; de Andrade et al., 2016; Kirkcaldy et al., 2019; Park et al., 2019). Some family members implicitly approved of e-cigarette use for cessation among adolescents who smoked cigarettes, and even gave them their own devices (Alexander et al., 2019; Camenga et al., 2015; Hammal & Finegan, 2016; Kirkcaldy et al., 2019):

My godmom, when I moved in with her a couple years ago…when I got my ﬁrst one, it was actually her brother that bought it for me because he found out I was smoking cigarettes (16-17, US) (Alexander et al., 2019, p. 96).

Among smokers there was a sense that parents would approve of e-cigarettes because it was a healthier alternative to cigarettes. Several college and high school smokers also described instances when their parents offered them e-cigarettes with the expectation that they would use them to quit smoking altogether (US) (Camenga et al., 2015, p. 1238).

Alongside implicit approval for cessation purposes, there was also evidence that vaping was ‘reluctantly tolerated’ (Kirkcaldy et al., 2019, p. 160) by family members of adolescents who smoked:

Victoria […] spoke of a friend, a dual user of both tobacco cigarettes and e-cigarettes, who was not supposed to use e-cigarettes at home but regularly did so: ‘I've got one friend that, like, she does it [in her bedroom]… she's not allowed but she, kind of, is ‘cause they don't do anything about it’ (16-17, UK) (Kirkcaldy et al., 2019, p. 160).

[…] some said that smoking parents could show signs of tolerance especially if they know that their kids are current CC [conventional cigarette] users or they themselves thinking about switching to EC [e-cigarettes] to help them quit (12-17, Canada) (Hammal & Finegan, 2016, p. 965).

Resultantly, some family members seemed to understand vaping as more acceptable than smoking and therefore adolescent use was sometimes permitted. However, this approval was fluid rather than fixed, as data from studies showed that some parents were initially disapproving of e-cigarettes and over time became more accepting of them (Alexander et al., 2019; Kirkcaldy et al., 2019).

In contrast, non-smoking participants commented on their parents’ (perceived) disapproval of e-cigarette use (Alexander et al., 2019; Camenga et al., 2015; Hammal & Finegan, 2016):

The vast majority of our students were sure that their parents would have a very negative reaction if they knew that their kids were EC user. They used terms like ‘‘disappointed, shocked, angry and mad, and disown me’’ to describe the expected reaction of the parents (12-17, Canada) (Hammal & Finegan, 2016, p. 965).

Middle school students and college and high school nonsmokers expressed parental disapproval of any e-cigarette use (US) (Camenga et al., 2015, p. 1238).

This evidence suggests an injunctive norm that e-cigarettes were approved of if it was thought adolescent smokers were using them to reduce or to quit cigarette smoking, but not if they were being used without a history of smoking. This suggests that approval from authority figures such as parents worked alongside perceptions of harm from e-cigarettes to create more of an injunctive norm.

### *Discreet use and adolescent rebellion*

Due to the lack of identifiable smell in comparison to tobacco cigarettes, e-cigarettes were perceived as easier to hide among adolescents (de Andrade et al., 2016; Hammal & Finegan, 2016; Hilton et al., 2016; Kirkcaldy et al., 2019; Peters et al., 2013; Wagoner et al., 2016): ‘an e-cigarette's a bit more discreet, you can't, like, smell it’ (12, UK) (Kirkcaldy et al., 2019, p. 160). While some participants noted that they vaped discreetly on the train (16, UK) (Lucherini et al., 2018, p. 1044) and ‘anywhere’ (15-17, US) (Peters et al., 2013, p. 303), covert and discreet e-cigarette use was most frequently discussed in terms of hiding vaping activities from family members and authoritative figures who disapproved of nicotine use (de Andrade et al., 2016; Hilton et al., 2016; Kirkcaldy et al., 2019; Wagoner et al., 2016). For example, Hilton et al. (2016, p. 5) note that e-cigarettes helped participants hide that they were nicotine users from family members (14-17, UK). Another vaper noted: ‘I like it because it doesn’t leave smoke behind so your parents wouldn’t know if you’re using’ (13-17, US) (Wagoner et al., 2016, p. 2008). Therefore, vaping could be a subversive but generally acceptable activity, that adolescents can simultaneously take pleasure in doing and in hiding from authority, while not experiencing the same level of perceived harm and disapproval that may come with smoking.

Furthermore, while participants from several studies noted the increased visibility of e-cigarettes in recent years in retail environments and spoke about possible ways to obtain devices and liquids (Alexander et al., 2019; Camenga et al., 2018; de Andrade et al., 2016; Hammal & Finegan, 2016; Hilton et al., 2016; Kirkcaldy et al., 2019; Weishaar et al., 2016), others discussed purchasing e-cigarettes in shops and online (Alexander et al., 2019; Camenga et al., 2018; Hilton et al., 2016; Weishaar et al., 2016):

It's easy to get them online to be honest because you can sneak a card or whatever, like that prepaid [card] from the gas station, put money on it, and use it (11-17, US) (Camenga et al., 2018, p. 192).

The shop-owner, he wouldnae [would not] care if he sold it tae somebody that’s under 18 or that. Cos he needs tae sell them, ken [you know], like—he has tae make his money fae [from] somewhere (17, UK) (Weishaar et al., 2016, p. 1640).

Therefore, some adolescents were not only discreetly using e-cigarettes to hide their nicotine consumption from family members who may disapprove of e-cigarette use, but they were also discreetly purchasing devices. This implies that e-cigarette use was understood as a transgressive behaviour - like smoking - that tests and pushes boundaries (Tokle, 2020). E-cigarettes may play a similar role in the transformation from childhood to adulthood; enabling a movement toward a ‘rebellious identity’ and ‘away from parental supervision and authority to a more autonomous identity’ (Scheffels, 2009, p. 476). However, unlike tobacco cigarettes, e-cigarettes can be used more discreetly and are therefore generating a new form of subversive rebellion among adolescents in comparison to smoking.

Vaping being discreet and perceived as less harmful than smoking blended for some participants to create the ‘best of both worlds’, which suggested a powerful synergistic effect:

For people that age [14] it [e-cigs] seems to be sort of the best of both worlds. You get to sort of rebel against the teachers ‘cause you’re doing something they don’t necessarily want you to do, but it doesn’t necessarily come with the harm of a cigarette (14, UK) (Hilton et al., 2016, p. 5).

The evidence here suggests an injunctive norm that vaping was becoming increasingly approved among adolescents rather than disapproved, in comparison to smoking in various ways: through approval of parents when adolescents are smokers, through discreet use that simultaneously hides the behaviour from authority figures, but also makes it more acceptable than smoking, and through a perception of reduced harm.

## Approval and disapproval amongst peers: peer and group identity

*‘Cool’ social vaping and performativity*

Many participants across studies referred to positive perceptions of e-cigarettes as ‘cool’ and ‘popular’, as well as fashionable, fun, technological and more accepted than cigarettes (Alexander et al., 2019; Camenga et al., 2018; Chen et al., 2019; de Andrade et al., 2016; Hammal & Finegan, 2016; Hilton et al., 2016; Park et al., 2019; Peters et al., 2013; Wagoner et al., 2016; Weishaar et al., 2016):

When it blows out smoke it looks cool … cos it’s not a proper fag (13-16, UK) (de Andrade et al., 2016, p. 292).

Well I think the main reasons (if I were to vape in the future) would be to look cool, to be popular, and to hang out with the cool people. I think those are the main reason (11, US) (Park et al., 2019, p. 84).

In the study by Chen et al. (2019) these positive perceptions of e-cigarettes were commonly related to e-cigarette advertisements that participants had seen. The ‘coolness’ of vaping was also often related to the performance of vapour tricks across studies (Alexander et al., 2019; Camenga et al., 2018; Chen et al., 2019; Hilton et al., 2016; Park et al., 2019). Several male participants discussed trying to recreate smoke tricks and large vapour clouds seen on social media (Camenga et al., 2018; Hilton et al., 2016; Park et al., 2019). For example one regular vaper noted: ‘lots of people do smoke tricks and I wanted to try them’ (16-17, US) (Alexander et al., 2019, p. 95). This suggests that, like with smoking, some participants were seeking to portray notions of expertise and skill in their e-cigarette use, perhaps to be perceived as genuine and experienced vapers (Haines et al., 2009). Another regular vaper noted that they prefer tank devices, because ‘[a cigalike] wouldn't give out a lot of smoke. Yeah, so it's kind of pointless’ (14-15, US) (Alexander et al., 2019, p. 95). This implies that for some adolescents the performance and visibility of vaping (or large vapour clouds) is important for others to see. Indeed, e-cigarettes were most commonly used with others, such as friends or siblings, instead of alone (Alexander et al., 2019; Camenga et al., 2018; de Andrade et al., 2016; Hilton et al., 2016). For these participants then, vaping could be seen as aspirational; signifying a level of social acceptance among their peer group based on the mastery of techniques and skills.

While the performance of vaping was a key influence in some participants’ attraction to, and use of, e-cigarettes, social influence was also discussed (Alexander et al., 2019; Chen et al., 2019; de Andrade et al., 2016; Hammal & Finegan, 2016; Hilton et al., 2016; Park et al., 2019; Roditis et al., 2019). Here, participants were influenced by friends saying they should try vaping, for example a regular vaper stated: ‘to be honest…it was just one of my friends kind of telling me, ‘Oh, yeah, you should try this’’ (16-17, US) (Alexander et al., 2019, p. 95). This was also related to flavour experimentation. For example, participants, including dual users, were influenced by peers to experiment with, and try, different and new flavours:

They’re good because, like, at a party, if you’re going out to a party, you never talked about fags [slang term for cigarette], you just said can I get a fag? Like now people are saying, ‘have you tried this ﬂavour, have you tried this colour?’ (17, UK) (Hilton et al., 2016, p. 5).

Loads of people in our school had them. Like, they were walking about and everyone was, like, ‘try this’, because they all had different flavours (13-16, UK) (de Andrade et al., 2016, p. 292).

Participants also discussed e-cigarette use in the context of trying to fit in with ‘cool’ people (Hammal & Finegan, 2016; Hilton et al., 2016; Park et al., 2019):

I feel like nowadays kids smoke [vape] to look cool or try to make themselves ﬁt in with somebody (16, US) (Park et al., 2019, p. 84).

They think it’s cool or maybe from peer pressure. They should do it because everyone else is doing it and they want to ﬁt in (12, Canada) (Hammal & Finegan, 2016, p. 964).

Many regular vapers noted that adolescent use of e-cigarettes is heavily influenced by their social contexts, suggesting that an injunctive norm of social approval and social aspiration had influenced their regular use.

### *Vaping as a disapproved ‘uncool’ trend*

While for some adolescents vaping was seen as cool and helped to fit in with certain peer groups, others (e.g. non-vapers) negatively perceived e-cigarettes and vaping. Here, e-cigarettes were understood as uncool, ‘wannabe’, embarrassing (Alexander et al., 2019; de Andrade et al., 2016; Hilton et al., 2016; Park et al., 2019):

They (e-cigarette users) think it's cool and that's going to make them popular, but really its' not (13, US) (Park et al., 2019, p. 85).

It looks stupit’ as ‘you’re sookin’ [sucking] on a metal thing (13-16, UK) (de Andrade et al., 2016, p. 292).

Alongside this disapproval, others, who previously perceived vaping as cool, felt it was a trend that has fallen out of fashion, further emphasising the fluidity and evolving nature of these norms (de Andrade et al., 2016; Hammal & Finegan, 2016; Hilton et al., 2016; Weishaar et al., 2016):

[E-cigarettes] were kind of popular in my school, like about a year ago like we’d bring them to parties. […] at that point it was seen as cool but now it’s sort of seen as a joke. Everyone seems to think they’re like kinda, they’re a bit embarrassing really (16, UK) (Hilton et al., 2016, p. 5).

Therefore, data demonstrated the ways in which non-vapers sought to distinguish themselves from vapers and vaping peer groups. Lucherini et al. (2019) also found that e-cigarette avoidance could be a sign of maturity among their disadvantaged young adult sample (including 18+), further implying that only certain groups may see e-cigarettes as a marker of peer group distinction and identity.

In relation to this disapproval of vaping, several participants felt that e-cigarettes were marketed directly towards ‘children’ and ‘teenagers’ (Chen et al., 2019; Hilton et al., 2016; Lucherini et al., 2019; Park et al., 2019), with Hilton et al. (2016, p. 5) noting that their participants (14-17) ‘expressed particular concerns that e-cigarettes were ‘inappropriate’ for, yet ‘attractive to children’’. A non-vaper from Chen et al. (2019, p. 6) stated: ‘they [e-cigarettes] come in different designs to attract teenagers and customers’ (12-17, US). Due to the marketing of e-cigarettes and liquids, Park et al. (2019, p. 85) also noted that a never-vaper (11, US) in their study implied that e-cigarettes were considered suitable for adolescents whereas tobacco cigarettes are used by adults. These findings indicate that while some adolescents approved of, and were attracted to e-cigarette flavours, others felt uncomfortable with, and disapproved of, the ways in which e-cigarettes were being normalised as a social activity for adolescents.

**Discussion**

By exploring descriptive and injunctive norms in this meta-ethnography, we have examined the attitudes and uses of e-cigarettes among adolescents with a range of vaping and smoking status. We identified two themes that indicated adolescents were aware of the broader issues currently being discussed in academic and public health debates about e-cigarettes: harm (especially as compared to conventional cigarettes), and addictiveness. These two themes leaned towards descriptive norms, as we did not interpret them as indicating strong approval or disapproval for e-cigarette use. However, these themes did reflect the divided perspectives on vaping arguably caused by mixed risk-communications and the resultant general confusion about the harms of e-cigarettes among lay populations (Morphett et al., 2020). We also identified more complex themes around peer and parental perceptions of e-cigarette use which indicated injunctive norms of approval and disapproval. However, these injunctive norms were also fluid, diverse and sometimes competing.

In terms of peer approval, some adolescents approved of vaping because it was ‘cool’ and enabled them to belong to certain social groups, much like smoking (Scheffels, 2009; Wiltshire et al., 2005). We also found that, like smoking, vaping portrayed maturity and expertise among peers in certain groups and was perceived as aspirational (Haines et al., 2009). However, we also found that for others, vaping was uncool and disapproved of, implying that e-cigarette use was not part of their group identity. These findings relate to those of Brown et al. (2020) who found that shared norms among adolescent peer groups in the UK manifest in the acceptance or rejection of vaping, with some non-vapers seeking to distinguish themselves from vapers and vaping peer groups. This further indicates the importance of social factors for adolescents when it comes to making decisions about vaping and for future research to take social context more seriously when collecting and analysing qualitative data.

We also found that some adolescents and parents implicitly approved of e-cigarette use for smoking cessation and alternative nicotine consumption among smokers. This approval was connected to a belief that vaping was less harmful than smoking, implying that comparative harm might be developing as an important injunctive norm among smoking adolescents and their parents. Further, although we found evidence that adolescents were hiding their vaping behaviour from family members and authoritative figures who disapproved, this discreet use was also based on the understanding that the behaviour was less harmful than smoking. The perception of reduced harm and discreet use may together create an acceptance of vaping in comparison to smoking among adolescents as a practice that ‘new – but not too harmful; transgressive – but not too boundary breaking’ (Tokle 2020, p. 5). Like smoking, adolescents may experiment with vaping and move in and out of this behaviour (Amos et al., 2009). Research efforts should therefore be focussed on exploring and tracking these evolving norms among adolescents longitudinally.

This review highlights the social processes at play among adolescents and how these processes could determine the normative attitudes towards e-cigarette use in the future. The findings reflect the general prevailing policy attitudes in the US and UK: where the US has adopted stricter regulation, and the UK has adopted more relaxed regulation (Green et al., 2016). On one hand, the injunctive norm of vaping approval for smoking cessation in adolescents presents a form of alternative nicotine consumption among adolescents where they may use e-cigarettes instead of tobacco cigarettes, resulting in further declines in youth tobacco smoking. On the other hand, the injunctive norms of vaping approval and discreet use could mean that adolescents may develop an addiction to nicotine via vaping, especially as attitudes to addiction seem uncertain and possibly malleable to public health or commercial messaging.

Therefore, our findings reflect the difficulty in establishing policy on e-cigarette visibility, availability and use. Our findings could be used to advocate for precautionary and stricter policies to reduce adolescent addiction and prevent the possibility of a vaping ‘epidemic’ (U.S. Department of Health and Human Services, 2018). Alternatively, they could be used to support more relaxed regulation consistent with ‘harm minimisation’ to provide adolescent smokers with an alternative and less harmful form of nicotine consumption.

It is clear however, that policymakers should consider the importance of normative processes for adolescents when it comes to making decisions about vaping. While we have placed these norms on a spectrum from approval to disapproval, we stress that any policy decision must be made with an understanding that these injunctive norms may be fluid and transient among adolescents (McKeganey & Barnard, 2018; Measham et al., 2016; Tokle, 2020). This fluidity needs to be considered when developing a comprehensive regulatory approach to e-cigarettes (Klein et al., 2020), since contextual factors may influence policy success (Papanastasiou et al., 2019).

Limitations

There are some limitations to this review. Firstly, most studies included in this review often recruited a broad age range, spanning from early to late adolescence (10-17). In presenting data, some authors did not cite the age of participants and did not reflect on the diversity of ages in their samples and conclusions. Therefore, we could not group participants in any other way than one broad ‘adolescent’ category. This highlights the need to differentiate, and reflect on, the range of ages in adolescence in e-cigarette research. We do however note that recent research, published after our review search date has started to do this (Brown et al., 2020; Tokle, 2020). Secondly, due to the ways in which data was presented in papers, it was not always possible to determine whether norms differed between different groups by gender, socioeconomic status, ethnicity, and smoking and/or vaping status. Last, the majority of studies included in this review were from the US and UK, highlighting a lack of diversity in in-depth qualitative research exploring e-cigarette use and perceptions among adolescents in countries beyond the UK and US.

**Conclusions**

This review has highlighted the emerging norms of vaping among adolescents through consideration of descriptive and injunctive norms. This review found that adolescent e-cigarette use was not wholly predicated on the descriptive norms of absolute harm and addiction. Instead, we found clearer evidence explaining approval and disapproval of e-cigarettes through injunctive norms. Vaping norms among adolescents are fluid, diverse and sometimes competing or contradictory. This review is a resource for policymakers and practitioners to understand the perceptions and uses of e-cigarettes in order to more effectively understand influences on adolescents’ e-cigarette use.

**Declarations of interest**

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