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Perceptions of friendship, peers and influence on adolescent smoking according to tobacco control context

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30 **Abstract**

31

32 **Background**

33 A relationship between smoking and interpersonal influences has been well established within
34 the literature. There have been cultural shifts in denormalisation and a reduction in tobacco
35 smoking in many countries. Hence there is a need to understand social influences on
36 adolescents' smoking across smoking normalisation contexts.

37

38 **Methods**

39 The search was conducted in July 2019 and updated in March 2022 within 11 databases and
40 secondary sources. Search terms included schools, adolescents, smoking, peers, social norms
41 and qualitative research. Screening was conducted by two researchers independently and in
42 duplicate. Study quality was assessed using the eight-item Evidence for Policy and Practice
43 Information and Co-ordinating Centre (EPPI-centre) tool for the appraisal of qualitative
44 studies. Results were synthesised using a meta-narrative lens for meta-ethnography and
45 compared across smoking normalisation contexts.

46

47 **Results**

48 Forty one studies were included and five themes were developed, mapping onto the socio
49 ecological model. The social processes by which adolescents take up smoking differed
50 according to a mixture of school type, peer group structure and the smoking culture within
51 the school, as well as the wider cultural context. Data available from smoking denormalised
52 contexts, described changes in social interactions around smoking to cope with its
53 stigmatisation. This was manifested through i) direct peer influence, whereby subtle
54 techniques were employed, ii) group belonging whereby smoking was less likely to be seen

55 as a key determinant of group membership and smoking was less commonly reported to be
56 used as a social tool, and iii) popularity and identity construction, whereby smoking was
57 perceived more negatively in a denormalised context, compared with a normalised context.

58 Conclusions

59 This meta-ethnography is the first study to demonstrate, drawing on international data, that
60 peer processes in adolescent smoking may undergo changes as smoking norms within society
61 change. Future research should focus on understanding differences across socioeconomic
62 contexts, to inform the adaptation of interventions.

63

64 Keywords: smoking; tobacco control; adolescents; schools; friendship; peer influence;
65 systematic review; meta-ethnography

66

67

68 Introduction

69

70 The relationship between smoking and peers has been well established within the literature,
71 with a review of qualitative research having identified interpersonal influences on smoking,
72 including a desire for peer acceptance and a sense of belonging(1). Previous research has
73 also established that smoking attitudes and behaviours of adolescents and their peers may be
74 influenced at multiple socioecological levels, which interact with interpersonal influences to
75 affect behaviour. For example, adolescent smoking has been found to be associated with
76 intrapersonal characteristics such as individual level socioeconomic status(2), self-esteem(3)
77 and the construction of ‘cool’ and ‘popular’ identities(4). At organisational and community

78 levels, influences on smoking might include school level socioeconomic status, the
79 development of subculture identities within schools(5, 6) and closeness of the school
80 community(7) whereby smoking uptake may diffuse through close knit peer communities
81 easily. However, most existing evidence has been captured prior to the introduction of
82 comprehensive smoking bans, in contexts where tobacco smoking remains highly
83 normalised(8, 9). Despite a large decrease in smoking prevalence, socioeconomic inequality
84 has prevailed(10-12). For example, young people living in the 20% most deprived areas in
85 England were found to be up to three times more likely to be smokers than their counterparts
86 in the 20% least deprived areas(13). The evidence above demonstrates the importance of
87 addressing structural determinants and considering tobacco control context when intervening
88 to reduce or prevent smoking.

89
90 The epidemiological context of adolescent tobacco smoking has changed, with prevalence of
91 youth smoking decreasing to its lowest level since the all-time highs at the turn of the 21st
92 century(14). Various legislation linked to pricing and tax, advertising, packaging and labelling,
93 and the banning of smoking in public places have been variably implemented in different
94 countries(15) perhaps in part caused by and causing a cultural shift towards smoking
95 denormalisation. Such denormalisation may have led to the reduction in effectiveness of anti-
96 smoking policies in UK schools. As fewer students already smoke, students exist in spaces
97 where tobacco norms have changed and those who continue to smoke may be less influenced
98 by the school norms(16). Despite this, many key interventions to target adolescent smoking
99 that have been found to be effective, are still based on harnessing peer influence and changing
100 pro-smoking norms within the school context(7). Therefore, it is vital for research to revisit
101 understandings of whether, and how, peer influence and selection still functions to diffuse

102 smoking attitudes and behaviours in school networks where smoking may be denormalised,
103 and how stakeholder perceptions can contribute to a greater insight.

104

105 The influence of community context has been shown in intervention research where schools
106 located in stable areas with high levels of community attachment had high smoking rates to
107 begin with. It is assumed the closeness of students meant increased contact between peer
108 educators and other students which led to increased intervention effects in these
109 communities(7). This assumption alludes to the influence of the student community on the
110 relationship between smoking and peers and sets up a hypothesis that smoking uptake diffuses
111 through close knit peer communities more easily. Thus, this has implications for the design of
112 interventions to tackle smoking in different school contexts. Much of the research supporting
113 the effectiveness of such interventions was conducted prior to the introduction of
114 comprehensive tobacco legislation within these countries. Thus, there is a need to explore these
115 claims with school stakeholders at different stages of the tobacco epidemic, with different
116 levels of tobacco normalisation.

117

118 Objectives

119 The need to understand health inequalities in relation to adolescents' smoking attitudes
120 suggests that a systematic review of qualitative research could contribute meaningfully.
121 Changes in the legislative context, can be used as a proxy for the extent or context of tobacco
122 denormalization within each country. In particular, a meta-ethnography, whereby variation in
123 tobacco denormalisation contexts are taken into account could help to elicit overarching
124 theoretical interpretations and understanding of the included primary studies, that are bigger
125 than the sum of their parts(17). This systematic review and meta-ethnography builds upon

Commented [GM1]: Feels a little journalistic

126 previous research by adding a focus on smoking normalisation contexts to address the
127 following research question and sub-questions:

128

129 1) How do school students (age 11-18), school staff, parents, or other education
130 professionals view peer influence on adolescent smoking attitudes and behaviours?

131 • How do these views vary over time according to the proximity of the
132 introduction of comprehensive smoking legislation at the time of data
133 collection?

134 • How do these views vary by individual and school-level socioeconomic
135 status?

136

137 **Methods:**

138

139 Protocol and Registration

140 The systematic review protocol was registered with PROSPERO (CRD42019137358) in April
141 2020 where further details may be found(18). The review is reported in accordance with the
142 Preferred Reporting Items for Systematic Reviews and Meta Analyses (PRISMA)
143 guidelines(19, 20) and the eMERGe meta-ethnography reporting guidance(21).

144

145 Eligibility Criteria

146 The search criteria were guided by the Sample, Phenomenon of Interest, Design, Evaluation,
147 Research type (SPIDER) framework(22). Publications meeting the criteria outlined in Table 1
148 were included.

149

150 [INSERT TABLE 1 HERE]

151

152 Information Sources and Searches

153 Searches for abstracts, full-texts and conference proceedings were conducted on 12th July
154 2019 and updated on 4th March 2022 by the lead author (HL). The following bibliographic
155 databases and a variety of secondary sources, including the reference lists of key included
156 publications, were searched; CINAHL Plus with full text, Embase, MEDLINE, Education
157 Resources Information Center (ERIC), British Education Index (BEI), Open Dissertations,
158 Psycinfo, Scopus, Applied Social Science Index & Abstracts (ASSIA), Sociological
159 Abstracts, and E-Theses Online Service (EThOS). The search was developed and refined in
160 MEDLINE (Appendix 1) before adapting to the specifications of each database.

161

162 Study Selection

163 Identified studies were de-duplicated in Endnote and subsequently imported into Rayyan
164 screening software. Each title and abstract was screened independently and in duplicate,
165 followed by full text screening of a smaller subset of records, shared between three researchers
166 (HL, HR, SJ). Discrepancies were resolved by a third reviewer (GJMT).

167

168 Data Extraction

169 A review data extraction form was developed and piloted with a subset of two studies. Full text
170 extraction was conducted by two independent reviewers (HL, CD), who extracted the following
171 data; title, year of publication, year of data collection, participant number and characteristics,
172 setting and tobacco control context, study design and methods, analysis, results and
173 conclusions.

174

175 Quality Assessment

176 All included studies were independently appraised for quality in duplicate, with workload
177 shared between three researchers (HL, CD, GJMT). Study quality was assessed using the eight-
178 item Evidence for Policy and Practice Information and Co-ordinating Centre (EPPI-centre) tool
179 for the appraisal of qualitative studies(23), which includes domains focused on the rigour of
180 sampling, data collection, and data analysis procedures. Further domains focused on whether
181 findings were supported by the data and their level of breadth and depth, privilege of children's
182 perspectives, reliability/trustworthiness and usefulness. Studies were rated low, medium, or
183 high according to the weight assigned for the trustworthiness of findings of each study for use
184 in this review. Discrepancies were resolved by a third reviewer (GJMT). Further details are
185 included in the review protocol(18).

186

187 Synthesis

188 A meta-narrative lens was applied throughout the seven stages of meta-ethnographic synthesis.
189 This novel approach was employed to obtain an understanding of how different paradigms may
190 have influenced this field. Meta-narrative reviews focus on an unfolding storyline of how fields
191 have changed over time, thus providing a methodology through which to understand true
192 changes in the social influence of smoking over time. These changes are in line with legislation
193 restricting smoking, and the extent to which methodological advances and paradigm shifts may
194 have had a role in these advances in understanding and changing results(17). This meta-
195 narrative approach required that the location of studies according to their position on a narrative
196 story line starting from contexts where smoking was highly normalised where comprehensive
197 tobacco legislation was yet to be introduced, contexts that were nearing introduction, and
198 extending to highly denormalised smoking contexts where comprehensive tobacco legislation
199 had already been introduced.

200
201 Findings were synthesised by the lead author (HL), and were verified by others during the write
202 up period. Studies were divided into eight groups (see Appendix 2 for table) according to the
203 timing of data collection in relation to the introduction of comprehensive tobacco legislation in
204 each respective country (10+ years before/no smoking ban introduced; 5-9 years before; 0-4
205 years before; or after the introduction of comprehensive tobacco legislation), combined with
206 the quality rating (high quality or medium/low quality). Organisation by chronological groups,
207 stratified by quality ensured that findings were not driven by low quality studies. The seven
208 phases of meta-ethnography were undertaken; getting started, deciding what is relevant to the
209 initial interest, reading the studies, determining how the studies are related, translating the
210 studies into one another, synthesising translations and expressing the synthesis(21). During
211 phase seven, expressing the synthesis, findings within each group were organised using the
212 socio-ecological model(24). Within each level of this model, a lines of argument approach was
213 employed to understand how the combination of individual findings contributed to a greater
214 understanding than each individual study(21).

215

216 **Results:**

217 **Study selection**

218 The searches identified 5365 records (see PRIMSA Figure 1). Forty one studies were included
219 in the systematic review. As the date of data collection was required for the chronological
220 analysis within this review, the authors of fourteen studies which did not specify the year of
221 data collection were contacted for each of these studies, with ten responding to provide the year
222 of data collection. Three did not respond and were therefore excluded from the review, one did

223 not respond, but was still included due to there being no comprehensive smoking legislation
224 introduced in the country and, therefore, being placed into the ‘before’ category.

225

226 [INSERT FIGURE 1 HERE]

227 *Figure 1. PRISMA flow diagram*

228

229

229 Overview of included studies

230 An overview of the characteristics of included studies and their methods and context are
231 included in Tables 2 and 3.

232

233 [INSERT TABLE 2 HERE]

234 [INSERT TABLE 3 HERE]

235

236 Of the 41 studies, seven were based in the United Kingdom, four in the USA, four in Canada,
237 two in India, three in Iran, two in the Netherlands, and one from each of the following countries;
238 Uruguay Romania, Morocco, Portugal, Taiwan, Cyprus, Turkey, Ireland, Malaysia, Greece,
239 Brunei, Sweden, Mexico, Nigeria, Spain, New Zealand, Nepal, Saudi Arabia, and Indonesia.

240 For the purpose of this study, comprehensive tobacco legislation was defined as legislation
241 banning smoking in all public spaces, including bars and restaurants and data were obtained
242 from www.tobaccocontrolaws.org. This legislation was introduced within the 41 included
243 studies between 2004 and 2019, with seven studies being conducted in countries, or regions
244 within countries, that still have no comprehensive tobacco legislation in place. See Figure 2 for
245 the year of introduction of comprehensive tobacco legislation by country/region.

246

247 All studies focused on young people, with participants aged between 10 and 19 years. Thirty-
248 two of the included studies employed focus groups, 19 face to face semi-structured interviews,
249 one small group semi-structured interview, one telephone semi-structured interview, one
250 unstructured face to face interview, one ethnography and one written narrative.

251

252

253 [INSERT FIGURE 2 HERE]

254

Figure 2. Year of introduction of comprehensive tobacco legislation by country/region. 1= British Columbia and Western Canadian Province, 2= Toronto and Vancouver, 3= Scotland, 4= England and Northern Ireland, 5= Hawaii, 6= Utah, 7= Newbraska, 8= Texas

255

256

257 Quality assessment

258 Seventeen included studies were rated as high, 19 medium and five low quality using the
259 Evidence for Policy and Practice Information and Co-ordinating Centre (EPPI-centre) tool for
260 the appraisal of qualitative studies(23). The majority of high quality studies came from the
261 following high income countries; the USA, UK, Canada, the Netherlands and Ireland, whilst
262 only three were based in lower and middle income countries; India, Iran, and Morocco.
263 Moreover, 14 out of 17 high quality studies, as well as all five low quality studies were
264 conducted before the introduction of comprehensive tobacco legislation. The detailed quality
265 assessments are available in Appendix 3.

266

267 Exploration of stakeholder views on adolescent smoking

268 Synthesis resulted in the conceptualisation of five themes, which link to the review's research
269 questions and broadly map onto the socio ecological model(24); context: culture and
270 socioeconomic status, perceived norms and modelling, perceived control, coercion and
271 encouragement, group belonging and social selection, and identity construction and
272 performance (see figure 3), which are all perceived to interact to affect peer influence
273 processes. The contributions of each study to the themes are detailed in Appendix 4.

274

275 [INSERT FIGURE 3 HERE]

276

277 *Figure 3. Themes mapped onto the social ecological model before and after the introduction of comprehensive smoking*
278 *legislation.*

279

280 **Context: culture and socioeconomic status: Before the introduction of comprehensive** 281 **legislation**

282

283 This theme focuses on the higher level determinants which set the wider context and interact
284 with the lower level determinants discussed in the subsequent four themes to affect smoking
285 behaviour. Nineteen studies published before the introduction of comprehensive tobacco
286 legislation contributed to this theme(25-43). The main findings within this theme centred
287 around culture and socioeconomic status.

288

289 The first key determinant was cultural norms. Family were generally seen to exert a stronger
290 influence on adolescents who were from ethnic minorities(31, 40), compared to those from a

291 white ethnic group. Moreover, it was perceived to be socially unacceptable for girls to smoke
292 in some cultures. For example, one study(31) collected data in Morocco, finding that girls were
293 more confident to resist smoking due to the unacceptability of girls' smoking in society. In
294 contrast, another study found that smoking was a desirable behaviour among adolescent
295 males(33). Adolescent male smokers in Saudi Arabia were perceived to be influenced by a
296 need to look 'Western' and 'civilised', although there were contrasting opinions on whether
297 smoking would help to achieve that(33).

298

299 In contrast, smoking was viewed as an integral part of the culture where adolescents were
300 perceived to be surrounded by smoking. This perception of high smoking prevalence and
301 cultural norms was perceived to have an important influence on whether an individual started
302 smoking. For example, in Tamvakas(40), smoking was seen as an integral part of the Greek
303 culture.

304

305 Results also touched upon findings according to school culture, with one study showing that
306 girls smoking to portray a 'hard' image and compete with boys was consistent across school
307 type from an inner city deprived school to a suburban predominantly middle class school(28).

308

309 Further results related to socioeconomic status. For example, students attending poorer
310 government schools in Morocco perceived boys' smoking to be brave, and students were
311 exposed to a higher prevalence of smoking among parents. Whereas students attending richer
312 private schools with higher quality teaching, lower smoking prevalence and lower exposure,
313 were perceived to have more confidence to resist pressure(31). Smoking was also perceived to
314 be determined by the lack of structured activities available for adolescents within poorer

315 areas(39), as well as taking part in weekend cultural leisure activities with friends that are
316 associated with smoking, such as going to discos.

317

318 Moreover, school level differences between schools of a similarly low socioeconomic status
319 were observed according to network structure and culture around smoking. A school with more
320 friendship groups was perceived to have a higher level of smoking and a more favourable
321 perception of smoking(41).

322

323 Overall, this suggests that the social processes by which adolescents take up smoking differ
324 according to a mixture of school type, peer group structure, socioeconomic composition and
325 the smoking culture within the school, as well as the wider cultural context.

326

327 **Context: culture and socioeconomic status: After the introduction of comprehensive**
328 **legislation**

329 Six studies published after the introduction of comprehensive legislation contributed to data on
330 contextual determinants(44-49). Again, contextual themes comprised of culture, identity and
331 socioeconomic status. Smoking was frequently perceived to be linked to those of a lower
332 socioeconomic status, with the age of initiation reported to be younger amongst groups of a
333 lower SES and linked to poorer academic outcomes(47).

334

335 In terms of culture, in certain countries, such as Iran, there were contradictory perceptions of
336 smoking for girls, such as 'high class' and 'elegant' versus stigmatised, immoral and
337 unacceptable(44, 45). Confidence to resist peer influence was varied and dependent upon
338 context, such as the cultural acceptance of girls' smoking(49).

339

340 School type related to socioeconomic status and smoking prevalence. Within communities and
341 schools of a higher socioeconomic status and a very low smoking prevalence and
342 normalisation, individuals were negatively evaluated for smoking. In turn, this affected the way
343 smoking occurred in groups, with adolescents avoiding smoking at school due to feelings of
344 shame and fear of negative evaluation(46) or creating pro-smoking groups to avoid stigma,
345 resulting in magnified isolation and stigmatisation(48).

346
347 Overall, culture and socioeconomic status were perceived as important contextual determinants
348 both before and after the introduction of comprehensive legislation. Data available after the
349 introduction of comprehensive legislation, in a more denormalised tobacco smoking context,
350 described changes in social interactions around smoking to cope with its stigmatisation,
351 particularly relating to the perceived association between smoking and a lower socioeconomic
352 status within affluent schools.

353

354 **Perceived norms and modelling: Before the introduction of comprehensive legislation**

355

356 This theme relates to how individuals perceive the smoking related attitudes and behaviours of
357 their peers, with 18 contributing studies published before the introduction of comprehensive
358 tobacco legislation(26, 29, 31-33, 36, 37, 39-42, 50-56). The main findings within this theme
359 showed that indirect influence also contributes to smoking behaviour among adolescents,
360 through their perception of smoking norms.

361

362 Examples of indirect influence were confined to an unspoken pressure to smoke due to
363 perceptions of smoking as the norm, with perceived high prevalence and positive attitudes
364 towards smoking among friends. Adolescents reported that smoking is a habit embedded within

365 friendships and linked to having friends who are smokers(32, 56). They reported that access to
366 cigarettes was easier and there was a will to smoke in order to not feel inferior to their smoking
367 friends and to search for social identity(55).

368

369 Findings showed that older adolescents model smoking behaviour, and that adolescents feel
370 confusion and tension when confronted with peer smoking and expectations, which often
371 contrasts with family expectations of refraining from smoking(42). Modelling was also
372 reported to exert influence on adolescents' decisions to smoke, with those with parents who
373 smoke being more likely to smoke themselves(29, 50). These adolescents also reported having
374 easier access to cigarettes and perceiving smoking as a normal part of adulthood(50).
375 Conversely, one study found that those who had smoking parents were more likely to perceive
376 this as a reason to avoid smoking, and to avoid modelling smoking to younger children(36).
377 Other influences were teachers who, in one study, were perceived to tolerate smoking among
378 adolescents, as long as it took place away from school buildings(51).

379

380 The influence of male family members, such as fathers and older brothers, on boys' smoking
381 behaviour was deemed to be particularly important in Saudi Arabia(33).

382

383 Overall, adolescents' perceptions of peer smoking norms, as well as behaviour modelled by
384 parents and older adolescents were important determinants of smoking behaviour. These
385 factors align with the contextual findings discussed above, which demonstrated that cultural
386 and socioeconomic determinants influenced the extent to which smoking was perceived as the
387 norm in different contexts. This may influence the extent to which modelling may affect
388 smoking behaviour.

389

390 **Perceived norms and modelling: After the introduction of comprehensive legislation**

391

392 Four studies published after the introduction of comprehensive legislation reported perceived
393 norms as being key to smoking behaviour(45, 47-49).

394

395 As with studies published before the introduction of comprehensive legislation, perceived
396 norms were perceived to indirectly influence smoking behaviour(45, 47-49). However,
397 perceived norms were also thought to impact upon adolescent smoking patterns. For example,
398 when school-level prevalence was low, this didn't necessarily encourage the uptake of
399 smoking, but it did pressurise those who smoke to operate outside of the school cohort's
400 mainstream culture, with smokers seeking a low profile or attending smoking friendly social
401 events. Whereas, in a high smoking context, smoking took place in the school, with little fear
402 of judgement by peers(48).

403

404 Modelling by parents and older siblings, as well as older peers, was also seen to contribute to
405 perceptions of norms and subsequent smoking(47, 49). Gender differences were also identified,
406 with girls perceived to be more likely to emulate smoking behaviour of individuals who are
407 important to them, whereas boys were perceived to emulate older individuals(47).

408

409 Overall, after the introduction of comprehensive legislation, smoking was viewed as a less
410 normative behaviour. Thus, the perceived norms of the school were reported to impact upon
411 where smoking took place and the extent to which adolescents made an effort to do this covertly
412 to avoid negative judgement. This finding relating to perceived norms aligns with the findings
413 within the context: culture and socioeconomic status theme, which demonstrated that this

414 negative judgement varied according to cultural and socioeconomic norms across different
415 countries and school settings.

416

417 **Perceived control, coercion, and encouragement: Before the introduction of comprehensive**
418 **legislation**

419

420 This theme relates to the interpersonal determinants of smoking behaviour in relation to
421 control, coercion, and encouragement from peers, with 29 contributing studies published before
422 the introduction of comprehensive tobacco legislation(25-35, 37-39, 41-43, 50-61). The main
423 findings within this theme showed that, intertwined with the need to belong to a group, was
424 direct peer influence.

425

426 Direct peer influence, manifested through control, coercion, and encouragement was reported
427 by the majority of studies(25-35, 37-39, 41-43, 50-61). Most descriptions involved acts, such
428 as being offered cigarettes or even forced, with an unspoken pressure to accept or be subject to
429 social exclusion or ridicule(52). This evidence of direct peer influence was contradicted by a
430 belief that adolescents can say no to this pressure without any repercussions, if surrounded by
431 real friends(28). Pressure was perceived to be more prevalent among early teens and males,
432 who were reported to be directly pressured to smoke to conform with a masculine identity(43).
433 Moreover, there were reports of individuals being ridiculed for refusing to accept a cigarette
434 and a perception of a lack of refusal skills among adolescents(29, 33).

435

436 There were also reports from one study that older students may derive status from directly
437 influencing younger students to emulate their smoking behaviour(30). Several studies found
438 that the need to fit in was competing with the need to also stand out as an individual. Moreover,

439 belonging to a non-smoking peer group was shown to facilitate adolescents' confidence to
440 resist coercion to smoke(27) and an individual's membership of several different peer groups
441 diluted peer influence(58). Membership of several peer groups reduced the need to smoke to
442 achieve group belonging.

443

444 Overall, direct peer influence was a prevalent theme amongst studies. This was manifested in
445 different ways, as a coercive process. Protective factors included belonging to multiple peer
446 groups or to one non-smoking peer group.

447

448 **Perceived control, coercion, and encouragement: After the introduction of comprehensive**
449 **legislation**

450

451 Eight studies published after the introduction of comprehensive legislation reported smoking
452 as being key to group belonging and social selection(44-49, 62, 63). As with studies published
453 before the introduction of comprehensive legislation, pressure was consistently reported from
454 peers by many studies, particularly in social settings.

455

456 For some, being offered cigarettes in a group setting was seen to exert pressure on individuals
457 to conform(47, 49), whilst others reported subtle forms of influence and even feeling the need
458 to support their smoking friends(63).

459

460 Pressure to smoke was perceived to manifest differently according to gender, with boys being
461 more likely to be physically or verbally coerced, and girls more likely to adopt subtle strategies
462 to encourage their peers to smoke(47).

463

464 Individuals were reported to differ in their ability to resist peer pressure in terms of the
465 confidence expressed and it was reported to be easier to express anti-smoking sentiment to
466 parents and family, rather than peers(49).

467
468 Overall, social influence in the form of control, coercion and encouragement was important in
469 both a pre- and post- legislative context. After the introduction of comprehensive legislation,
470 girls were reported to use more subtle coercion techniques. According to the previous themes,
471 gender norms varied according to culture, thus these themes may interact to affect the manner
472 in and extent to which different genders are influenced by their peers.

473

474 **Group belonging and social selection: Before the introduction of comprehensive legislation**

475

476 Thirty studies reported smoking as being key to group belonging and social selection(25, 27,
477 28, 30-43, 50-54, 56-61, 64, 65). This theme relates to the interpersonal determinants of
478 smoking behaviour in relation to the need to be accepted and belong to a group and social
479 selection, whereby individuals choose their group of friends according similarity in smoking
480 status.

481

482 Within twenty-five studies, smoking was seen as a way to facilitate increasing popularity,
483 creating a social identity and gaining acceptance into a group through the creation of shared
484 activities and experiences(25, 27, 28, 30, 32-38, 40-43, 50-52, 54, 56-60, 64). Specifically,
485 smoking was perceived to allow individuals to mix with older children, as well as accessing a
486 wider variety of social groups(36, 38, 40). This suggests that smoking may be used by
487 adolescents as a tool to facilitate social interaction and status, as opposed to being an inherently
488 enjoyable activity. Indeed, within many of the included studies, smoking was perceived

489 consciously as a social tool allowing adolescents to converse, connect and feel less awkward
490 in a social setting(40, 60). Some adolescents even described forcing themselves to acquire the
491 taste so that they were able to make use of this social tool(60).

492

493 Others showed adolescents to have a sophisticated understanding of smoking as a tool to avoid
494 rejection and create a shared narrative among group members as well as other factors such as
495 showing commitment to the group and developing outgroup discrimination for those who do
496 not smoke(57). Reports of the use of smoking as a social tool are linked to social selection, or
497 adolescents choosing friends according to their smoking status, with reports of adolescents who
498 wish to smoke, subsequently seeking out smoker friends(28). Smoking was also used as a tool
499 was to gain entrance to new social groups and start new conversations and to participate in
500 cultural activities outside of school, such as clubbing(64). Thus, the use of smoking as a tool
501 to facilitate group belonging, is likely to vary according to context. However, as highlighted in
502 the section above, smoking was only perceived to facilitate social acceptance when the
503 individual was a competent and confident smoker, otherwise the act could have the opposite
504 effect of undermining their group acceptance(30, 53).

505

506 Group belonging and identity, alongside the process through which smoking was integrated
507 into friendships, were found to be more important for girls, where smoking and sharing
508 cigarettes allowed them to fully engage in group activities, create a group identity, and create
509 a balance between obtaining social capital and being stigmatised for smoking(25, 52). For
510 example, girls reported smoking being linked to social cohesion and trust to reinforce social
511 bonds, bound by willingness to share cigarettes, whereas boys were more likely to go to
512 extreme measures to get money for their own cigarettes and were averse to sharing. Moreover,
513 boys reported smoking to portray an image consistent with group members, but also reported

514 having the opportunity for avoiding smoking through the creation of alternative identities
515 around activities, such as sport. Whereas girls were more likely to spend break times
516 undertaking sedentary activities(65). Further to this, girls were also more likely to associate,
517 be romantically involved with and be influenced by older boys and to have to accept a lower
518 status if they decided not to smoke(35).

519

520 Overall, prior to the introduction of comprehensive legislation, where smoking was more
521 normalised, smoking behaviour was viewed as an important tool to enhance adolescents'
522 group belonging and popularity. Again, relating back to the findings reported within the
523 previous themes, the use and effectiveness of smoking as a social tool may vary according to
524 cultural norms, such as the social acceptability of girls' smoking.

525

526 **Group belonging and social selection: After the introduction of a comprehensive smoking**
527 **ban**

528

529 Seven studies published after the introduction of comprehensive legislation reported smoking
530 as being key to group belonging and social selection(44-48, 62, 63). The main findings within
531 this theme, like the findings from before the introduction of comprehensive legislation,
532 demonstrated that adolescents perceived smoking to be key to group acceptance, while refusing
533 to smoke could result in rejection from a group. Thus, adolescents reported being afraid to say
534 no, or not to conform, due to the perceived risk of losing friendships and the associated support
535 network(46, 48, 62).

536

537 This was reflected in adolescents reporting the need to smoke in order to belong to a group(46,
538 47). It was viewed as awkward to smoke alone, for example, adolescents would wait for school

539 breaks when a group could congregate(48). Students reported getting into a routine of smoking
540 with friends, which would then lead to making good memories and a group atmosphere. This
541 was perceived to reinforce smoking behaviour, despite awareness of the health risks(48).

542

543 In contrast, other findings showed that girls felt smoking was not essential for group
544 membership(48) and that individuals valued health over and above the need to belong to a
545 group, and that non-smokers deselected smoker friends(63). A further study found more boys
546 to report smoking in groups than girls(47). There was also evidence from only one study, based
547 in Iran, to suggest that smoking was used as a tool to achieve adolescents' social needs(44).

548

549 To summarise, before comprehensive legislation was introduced, and smoking was more
550 normalised, smoking was strongly perceived to be key to group acceptance and popularity.

551 Whereas, after the introduction of comprehensive legislation, where smoking was more
552 denormalised, smoking was not always a prerequisite for group membership, reports of the
553 use of smoking as a social tool were less prevalent and smoking behaviour was not always
554 strongly perceived to be linked to group acceptance and popularity. This decreased
555 prevalence aligns with the findings discussed within the context: culture and socioeconomic
556 status theme, which demonstrated that after the introduction of comprehensive tobacco
557 legislation social acceptability of smoking varied according to school-level socioeconomic
558 status. Thus, the social selection and group belonging processes described above would vary
559 according to contextual determinants.

560

561 **Identity construction and performance: Before the introduction of comprehensive**
562 **legislation**

563

564 Twenty three studies reported smoking as contributing to identity construction and
565 performance(28-31, 33-39, 41-43, 50, 52-54, 59-61, 64, 65). Identity construction was seen as
566 the perception of the role of smoking in facilitating the formation of a certain identity. Whilst
567 performance relates to the act of using smoking related symbolism, such as the act of smoking,
568 appearing to smoke or carrying cigarettes. These identities and the associated behaviour can
569 both be influenced by others or initiated by individuals who then select friends with similar
570 identities(66).

571

572 The majority of studies focused on smoking as a way of creating a self-identity at an important
573 stage of development. Mainly, this was manifested in adolescents reporting smoking to look
574 cool, hard(28, 39, 41, 42, 50, 52-54, 59-61, 64, 65), mature(31, 33-35, 41-43) or popular(38,
575 41, 42, 64, 65). With males in particular aiming to portray a brave and masculine identity(29,
576 33, 36, 43, 61).

577

578 However, opinions differed on whether smoking was actually perceived as an activity
579 undertaken by popular or 'cool' individuals or not. For example, individuals reported negative
580 personal perceptions of smoking(41), whilst reporting a belief that others perceive cigarettes
581 as cool, good for them and fun(42). Thus, this misperception may work to perpetuate the
582 perceived need to smoke to look cool. Indeed, the perception of smoking as cool was seen by
583 some to be more important in influencing smoking behaviour than peer influence. It was

584 reported that smoking could carry both a high and a low status as it was just one element of
585 being cool, rather than a measure of 'cool' in itself(65).

586

587 Other factors, such as ethnicity and gender were also reported to affect smoking behaviour. For
588 example, girls were motivated by trying to look mature and by using smoking as a tool to
589 overcome traditional female stereotypes and assert equality by competing with boys(64).

590

591 One study highlighted that smoking awkwardly or symbolic smoking through techniques such
592 as pretending to inhale could actually do more harm than good to an individual's social
593 status(30). Others reported that smoking was simply an activity that they engage in, not
594 something that was perceived as key to identity(37).

595

596 Overall, the majority of studies found smoking and its associated performative acts to be key
597 to adolescent identity construction. Opinions differed on the extent to which smoking was
598 perceived as 'cool', but the majority perceived this to be the case (28, 39, 41, 42, 50, 52-54,
599 59-61, 64, 65).

600

601 **Identity construction and performance: After the introduction of comprehensive legislation**

602

603 Six studies published after the introduction of comprehensive legislation reported smoking as
604 being part of identity construction and performance(44-48, 63). The main findings within this
605 theme showed that a number of individual determinants contributed to adolescents' decision to
606 start, and continue, to smoke, with a large proportion of the data focusing on smoking as a way
607 of developing a sense of identity. Much like the findings from before the introduction of
608 comprehensive legislation, although somewhat less prevalent, reasons cited included trying to

609 appear 'cool'(46, 63). Appearing 'cool' was found to be a key motivator where adolescents
610 attended a school with a high smoking prevalence, with one study citing girls and boys smoking
611 to appear 'hard' or 'tough' or 'high class'(46).

612
613 Others suggested that smoking was not perceived as cool, particularly in a society where
614 smoking has become denormalised and the adverse health effects are so well known. Smoking
615 was instead overwhelmingly perceived as something which caused adolescents to be alienated
616 from school culture(63). It was also perceived as a behaviour deserving of sympathy due to
617 signalling unhappiness in an adolescent's life(63). This sentiment was echoed in other studies
618 where adolescent smokers discussed the need to hide their smoking from peers for fear of being
619 judged negatively(48).

620
621 Others suggested smoking was a way to get attention and stand out from the crowd and can
622 often be used as a largely symbolic activity by carrying cigarettes, without fully engaging in
623 the activity. This symbolism varied according to countries, with data from Iran finding that
624 participants perceived smoking to be a symbol of being high class or sophisticated(44, 45).

625
626 Overall, the data from after the introduction of comprehensive smoking legislation, in a more
627 denormalised context, reports more negative perceptions of smoking and outlines the social
628 risks, such as negative judgement from peers, of engaging in the behaviour. Whilst the data
629 from before the introduction of comprehensive legislation found some individuals to perceive
630 smoking negatively, the data did not reflect this as a wider opinion. These findings align with
631 the findings described within the above themes. For example, the contextual determinants, as
632 well as lower perception of smoking as the norm in a more denormalised tobacco smoking
633 context would combine with identity construction to determine a lower likelihood of the use of

634 smoking to portray a 'cool' image and of individuals being influenced to smoke in order to be
635 perceived as 'cool'.

636

637 Discussion

638 This meta-ethnography is the first study to demonstrate, drawing on international data, that
639 peer processes relating to adolescent smoking may undergo changes as norms for smoking
640 within society change. Overall, findings showed that adolescents' fears of negative
641 judgement due to smoking were more commonly reported in a more denormalised tobacco
642 smoking context. Whilst adolescents also less commonly reported using smoking as a social
643 tool to facilitate group belonging, social status and gender equality within a more
644 denormalised tobacco smoking context.

645

646 Social influence and selection were reported to occur across tobacco smoking normalisation
647 contexts, both before and after the introduction of comprehensive smoking legislation.
648 However, the social groupings in which control, coercion and encouragement occurred
649 differed within normalised and denormalised contexts, occurring in the mainstream school
650 culture within normalised contexts, but mainly occurring within groups alienated from the
651 mainstream culture within denormalised contexts. This continued importance across temporal
652 contexts, suggests that both processes should be considered within future intervention
653 development, but that this should be adapted according to the level of tobacco
654 denormalisation. Currently, interventions tend to focus on education as well as harnessing
655 social influence in a positive manner to facilitate adolescents to exert influence on peers not
656 to take up smoking, or to quit if they have already taken up the habit(7).

657

658 Gender, cultural determinants and school-level socioeconomic context were reported to be
659 important across tobacco smoking normalisation contexts. Despite this, results relating to
660 socioeconomic status were sparse. Only 17 out of 38 studies reported students' SES, six studies
661 focused on participants mainly from deprived communities(26, 39, 41, 42, 46, 53) and only
662 four studies assessed results separately according to school-level SES(31, 48, 49, 61).

663
664 Results of the synthesis conducted in a more normalised tobacco smoking context consistently
665 showed evidence of adolescents using cigarettes as a social tool. Reports of using cigarettes as
666 a social tool differed after the introduction of comprehensive legislation, in a more
667 denormalised tobacco smoking context. These differences included increased discussion of
668 how smoking was not an essential factor for group membership and only one study reporting
669 the use of smoking as a social tool. These results could be explained by the fact that smoking
670 is reported to become increasingly stigmatised within societies where smoking has become
671 denormalised. Thus, aligned with the findings of the current review, regular smoking instead
672 becomes a socially unacceptable behaviour which tends to occur within groups of smokers,
673 and covertly to avoid the attached stigma(67, 68). Thus, these contextual issues may contribute
674 to the perpetuation of socioeconomic inequalities in smoking and marginalisation as a result of
675 smoking(46).

676
677 Current interventions do not account for the differing processes occurring within different
678 school contexts reported within this review. These include differing socioeconomic
679 composition, culture, social norms relating to smoking and subsequently differing smoking
680 behaviour, such as whether smoking takes place as a central or peripheral activity. These
681 interventions may therefore miss opportunities to effectively target those of a lower
682 socioeconomic status, both at a school level and an individual level, such as individuals from

Commented [JH2]: Is it worth keeping this in as one of the few findings related to SES?

Commented [GM3R2]: Yes, I think so. Perhaps noting that there was little data on SES here.

683 a lower SES attending affluent schools(10). This is consistent with a previous systematic
684 review which found that only one in four health behaviour interventions mentioned SES
685 inequalities. A recommendation was made for the need for routine testing of the effects of
686 future interventions on inequalities(69). Both the mechanisms of identifying which pupils to
687 train as peer supporters (i.e. who will exert social influence), and training provided to peer
688 supporters about interacting with other students (i.e. how peer supporters are selected into
689 social groups) could differ according to school context. Further research is required to focus
690 upon differences between school contexts and how we can adapt interventions to enhance their
691 effectiveness within different schools in contexts where smoking has now become
692 denormalised(70). For example, A Stop Smoking in Schools Trial (ASSIST) Global states that
693 the intervention is likely to work within low income countries where smoking remains
694 normalised(71).

695
696 Results for the synthesis focused on more normalised tobacco smoking contexts showed
697 reports of girls using cigarettes as a tool to strive for gender equality, through strategies such
698 as trying to portray a 'hard' image(64). Reporting of this did not differ according to SES. One
699 explanation for this could be that smoking was still normalised within society and, thus,
700 smoking as cool still dominated across SES settings. This was not reported within studies
701 conducted after the introduction of comprehensive legislation, within more denormalised
702 tobacco smoking contexts.

703
704 Parental modelling was reported to be an important influence on smoking among adolescents
705 in both normalised and denormalised tobacco smoking contexts. This is consistent with
706 Previous studies which have shown adolescents from a lower SES to experience increased
707 exposure to parental smoking in comparison with their affluent peers(9). Thus, this may

708 contribute to the perpetuation of inequalities in a context where overall levels of smoking are
709 reducing, but more slowly among lower SES groups(12).

710

711 The results of this study are aligned with the sister review of quantitative social network effects
712 on adolescent smoking. With a focus on network characteristics, findings showed variation in
713 the composition and effect of network characteristics on smoking across different types of
714 school, including those differing according to socioeconomic status and other
715 characteristics(11). Conclusions were aligned with the current review, revealing the lack of
716 focus on socioeconomic status and the need for future research to employ these methods to
717 understand how network structure and its influence on adolescent smoking may differ across
718 school types.

719

720 Strengths and limitations

721

722 The main strengths of this systematic review are the thorough review processes undertaken,
723 such as double screening and quality assessment. This review only identified eight eligible
724 studies(44-49, 62, 63) that were conducted after, compared to 31 studies(25-43, 50-61, 64, 65)
725 conducted before the introduction of comprehensive smoking legislation. All eight of these
726 studies were conducted between two and ten years post-legislation. Researchers who
727 conceptualise schools as complex systems have consistently advocated for longer follow-up
728 periods of at least ten years within studies to allow any changes to become embedded within
729 the system(72). Thus, a larger volume of future research is required to focus on social influence
730 processes within contexts at least ten years after the introduction of such legislation. This would
731 help to obtain a greater insight into how the denormalisation of tobacco smoking has altered
732 social influence processes within school systems. In addition, the use of a proxy measure to

733 understand denormalisation may have affected the accuracy of the results, through restricting
734 the ability to understand different levels of denormalisation, as opposed to treating
735 normalisation and denormalisation as dichotomies. A more specific measure would have
736 allowed for differentiation between levels of denormalisation, although this was beyond the
737 scope of the current review.

738

739 Further to this, there are several reasons why results should be interpreted with caution. The
740 heterogeneity of study characteristics, including methods, sample size and characteristics and
741 culture, make direct comparisons between studies difficult. There was also a lack of diversity
742 between studies, with the majority of evidence coming from high income countries. While
743 information on e-cigarette use was beyond the scope of the study, this is an important
744 contextual issue for cigarette smoking that should be considered within future studies and
745 systematic reviews.

746

747 Conclusions

748

749 Within the context of tobacco smoking denormalisation, fears of negative judgement and
750 stigma related to smoking have increased among adolescents, and the use of smoking as a social
751 tool has decreased. Both social influence and selection and school level SES have maintained
752 their importance in perceived differentiated processes across contexts. A greater volume of
753 future research should ensure a measurement and focus on SES both at the individual and
754 school level, gender and cultural contexts, and focus on contexts where comprehensive
755 legislation has been introduced for at least ten years, thus further accelerating denormalisation.
756 This would facilitate an enhanced understanding of how differences across school-level SES

757 contexts manifest once post-legislative norms have been established. Subsequently, this would
758 allow future interventions to be adapted to different school contexts to tackle inequalities.

759

760 **Declarations**

761 **Ethics approval and consent to participate:**

762 All methods were carried out in accordance with relevant guidelines and regulations.

763

764 **Consent for publication:**

765 Not applicable.

766

767 **Availability of data and materials:**

768 Quality assessments and study contributions to themes are available in the Appendices.

769

770 **Competing interests:**

771 The authors declare that they have no competing interests.

772

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788

789 **Authors' contributions:**

790 HL led the review. HL, JH, RE, GJMT, MM1, FD and GM developed the protocol. HL and
791 MM2 developed the search strategy. HL, HR, SJ and CD undertook study screening and
792 GJMT helped to resolve discrepancies and queries. HL and HR extracted the data. HL
793 analysed the data and HL wrote the manuscript. The manuscript was reviewed and revised by
794 all authors.

795

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801

802 **List of abbreviations:**

803 ASSIST: A Stop Smoking In Schools Trial; ASSIA: Applied Social Sciences Index and
804 Abstracts; BEI: British Education Index; CINAHL: Cumulative Index to Nursing and Allied
805 Health Literature; EPPI-centre: Evidence for Policy and Practice Information and Co-
806 ordinating Centre; ERIC: Education Resources Information Center; ETHOS: E-Theses

807 Online Service; NA: Not Applicable; PRISMA: Preferred Reporting Items for Systematic
 808 reviews and Meta-Analyses; PROSPERO: Prospective Register of Systematic Reviews;
 809 SABM: Stochastic Actor-Based Models; SES: Socioeconomic Status; SNA: Social Network
 810 Analysis; SPIDER: Sample, Phenomenon of Interest, Design, Evaluation, Research type;
 811 SURE: Specialist Unit for Review Evidence;

812

813 **Tables**

814 *Table 1. Eligibility criteria according to the SPIDER framework*

SPIDER Framework	Description
Sample	<ul style="list-style-type: none"> • Studies that sought school students (age 11-18), school staff, parents or other education professionals' views and were focused on whole population, or students of a low socioeconomic status. • Studies that focused on special populations, for example, cannabis smokers were excluded.
Phenomenon of Interest	<ul style="list-style-type: none"> • Studies that focused on friendship, peers, influence and selection. • Studies were excluded if they focused exclusively on waterpipe tobacco, e-cigarettes and other forms of nicotine inhalation as well as passive smoking and cessation studies.
Design	<ul style="list-style-type: none"> • Qualitative or mixed methods studies with a qualitative element including interviews, focus groups, and observations.
Evaluation	<ul style="list-style-type: none"> • Studies that sought participants' views, perceptions or attitudes.
Research Type	<ul style="list-style-type: none"> • Date: Papers published using data collected during or after 1997. This is the year that adolescent smoking peaked in the US (30). Corresponding authors were contacted directly to request this information, where this was omitted in papers. • Language: No language or geographical limits were set, but comparisons were made within the analyses according to whether the data were collected before or after the introduction of comprehensive smoking legislation covering bans on smoking in all work places and public places, including restaurants and bars, in each respective country.

815

Author and year	Year of data collection	Participant characteristics			Country	Quality assessment
		Age	Number	Socioeconomic status		
Amos et al. (2007)	2002	Range 15-16 years	46 (24 females and 22 males)	4 focus groups from middle class (ABC1) and 4 from working class (C2DE)	UK (Scotland)	HIGH
Arora et al. (2010)	2005	Range 10-19 years	37 (6 females and 31 males)	2 low SES communities	India	MEDIUM
Baheiraei et al. (2017)	2012	Range 15-18 years	11 females	Not recorded	Iran	MEDIUM
Baillie et al. (2005)	2000-1	Range 14-18 years, mean 16 years	35 (17 females and 18 males)	Not recorded	Canada (British Columbia)	HIGH
Craciun et al. (2008)	2005-6	Range 14-15 years	30 (15 females and 15 males)	Not recorded	Romania	LOW
Denscombe et al. (2001)	1997-8	Range 15-16 years	Focus groups 123, interviews 20	Not recorded	UK (England)	HIGH
Denscombe et al. (2001b)	1997-8	Range 15-16 years	Focus groups 123, interviews 20	Not recorded	UK (England)	HIGH
Dijk et al. (2006)	2003	Range 15-17 years	101	Not recorded	Netherlands	MEDIUM
El Kazdoui et al. (2018)	2016	Range 14-16 years	100	2 schools - one classed as "advantaged", the other as "disadvantaged"	Morocco	HIGH
Fithria (2022)	2019	Range 12-18 years	24 male students	Schools located in regions with a poverty level of 15.41%	Indonesia	LOW
Fraga et al. (2011)	2003-4	Mean/range 13 years	30 (15 females and 15 males)	Not recorded	Portugal	LOW
Haines et al. (2009)	2005-6	Range 16-19 years	25	No data collected but researchers say that most appeared to be mid to high SES	Canada (Toronto)	MEDIUM
Hong et al. (2015)	2013	Range 13-18 years	12	Not recorded	Taiwan	MEDIUM
Ioannou et al. (2010)	2002	Range 15-17 years	25 (13 females and 12 males)	States 'diverse socioeconomic backgrounds'	Cyprus	MEDIUM
Jafari (2022)	2020	Mean 16 years	20 females	Not recorded	Iran	MEDIUM
Johnson et al. (2003)	2000-1	1st phase mean = 16, range 14-18; 2nd and 3rd phases mean = 16, range 13-19 years	1st phase 47 (29 females and 18 males); 2nd and 3rd phases - 25 (14 females and 11 males).	Not recorded	Canada (Vancouver)	HIGH
Lewis et al. (2003)	2009	Range 11-18 years	52 (30 females and 22 males)	'Disadvantaged community' - "The youth club featured is situated in a former coal-mining village which, according to the index of multiple deprivation score (North East Public Health Observatory 2007), is amongst the 10 per cent most deprived wards in a county that is one of the most deprived in England. Unemployment levels are in the highest quintile (Durham County Council 2012) for the county."	UK (England)	HIGH
Milton et al. (2008)	2001	Range 9-11 years	76	Over half of the cohort lived in low-income families, and 82% lived in the most deprived quartile (the poorest quarter of addresses) in the northwest of England as calculated using Townsend's indices of deprivation.	UK (England)	HIGH
Mishra et al. (2005)	2002	Range 10-16 years	435 (181 females and 254 males)	Government run schools with low-medium SES; private schools with medium-high SES were included.	India	HIGH
Mitschke et al. (2008)	2006	Range 10-14 years	54 (35 females and 19 males)	Not recorded	USA (Hawaii)	MEDIUM
Mutaz (2020)	unknown	Range 12-16 years	103 males	Not recorded	Saudi Arabia	MEDIUM
Niknami et al. (2008)	2004-5	Range 10-47 years	62 (92% male)	Not recorded	Iran	HIGH
Nwafor et al. (2012)	2008	Not recorded	40 male	Not recorded	Nigeria	LOW
Perez-Milena et al. (2012)	2008-9	Range 12-18 years	44 (6 focus groups ranging from 17%-78% female)	Within the six focus groups, there were between 0-33% composition of the lowest socioeconomic group, between 42-83% middle and 11-50% highest.	Spain	MEDIUM
Peterson et al. (2019)	2012-13	Range 12-16 years	81	Students are rated high/medium/low SES but no info on how this has been done.	Uruguay	MEDIUM
Plano Clark et al. (2002)	1999	Mean 16 years	205 (plus 66 student co-researchers)	Not recorded	USA (Newbraska)	HIGH
Plumridge et al. (2002)	1999	Range 14-15 years	42	School of relatively high socio-economic catchment (decile 8 ranking)	New Zealand	MEDIUM

Author and year	Year of data collection	Participant characteristics			Country	Quality assessment
Povlsen et al. (2018)	2013	Range 13-16 years	71 (36 females and 35 males)	2 public and 2 private schools/castes recorded	Nepal	MEDIUM
Rothwell et al. (2011)	2007	Mean 17 years, range 14-17 years	28	Not recorded	USA (Utah)	MEDIUM
Sanchez Martinez et al. (2008)	2005	Range 16-17 years	14	Not recorded	Mexico	LOW
Schreuders et al. (2019)	2016-17	Ranges: focus groups: 14-17 years old; interviews 15-18 years old	22 for focus groups; 14 for interviews	1 vocational school and one mid-level theoretical school	Netherlands	HIGH
Stewart-Knox et al. (2005)	1997-2000	Ranges: Year 1: 11-12 years old; year 2: 12-13 years old; year 3: 13-14+ years	Year 1: 102 (52 females;50 males); Year 2: 51 (28 females;23 males); Year 3: 39 (22 females; 17 males)	Not recorded	UK (Northern Ireland)	HIGH
Stjerna et al. (2004)	1999	Range 14-15 years	43 (25 females and 18 males)	Schools had 'average SES structure'	Sweden	MEDIUM
Talip et al. (2016)	2015	Mean 14 years, range 13-17 years	43 males	Not recorded	Brunei	MEDIUM
Tamvakas et al. (2010)	2009	Mean 15 years, range 14-16 years	31 (14 females and 17 males)	Not recorded	Greece	MEDIUM
Tohid et al. (2011)	2008-10	Mean/range 16 years	26 (3 females and 23 males)	Not recorded	Malaysia	MEDIUM
Treacy et al. (2007)	1997	Longitudinal - yearly from 11-12 to 15-16 years	1 st round 78(44 females and 34 males); 2 nd round 48; 3 rd round 19; 4 th rounds 33	Most of sample from working-class areas of Dublin	Republic of Ireland	HIGH
Turner et al. (2006)	2000-1	Mean/range 13 years	136	Both schools served disadvantaged populations	UK (Scotland)	HIGH
Vazquez et al. (2018)	2015	Range 9-19 years	49 (60% males)	90% eligible for free school lunch	USA (Texas)	HIGH
Woodgate et al. (2015)	2007-10	Mean 14.5 years, range 11-19 years	75	72% identified as middle class	Canada (Western Canadian Province)	HIGH
Yuksel et al. (2005)	2001-2	Median 16 years	52 youth (19 females and 33 males) + 24 adults (teachers/school counsellors/parents)	Not reported	Turkey	MEDIUM

818

819

820 *Table 3. Study methods and smoking legislative context*

Author and year	Data collection methods	Analysis	Substance focus	Country and year of smoking ban	Synthesis category
Amos et al. (2007)	Face to face single sex focus groups	Thematic	Smoking only	Scotland (UK) 2006	0-4 years before
Arora et al. (2010)	Face to face focus groups	Thematic	Smoking and smoke-free tobacco	India no comprehensive ban	10+ years before
Baheiraei et al. (2017)	Telephone semi-structured interviews	Thematic (constant comparative analysis/content analysis)	Smoking only	Iran 2007	After
Baillie et al. (2005)	Face to face semi-structured interviews	Thematic (narrative enquiry)	Smoking only	Canada (British Columbia) 2008	5-9 years before
Craciun et al. (2008)	Face to face semi-structured interviews	Thematic (content analysis)	Smoking only	Romania 2016	10+ years before

Denscombe et al. (2001)	Face to face focus groups and semi-structured interviews	Thematic	Smoking only	England (UK) 2007	5-9 years before
Denscombe et al. (2001b)	Face to face focus groups and semi-structured interviews	Thematic	Smoking only	England (UK) 2007	5-9 years before
Dijk et al. (2006)	Face to face group interviews	Thematic	Smoking only	Netherlands 2008	5-9 years before
El Kazdoun et al. (2018)	Face to face single sex focus groups	Thematic (inductive)	Substance use	Morocco no comprehensive ban	10+ years before
Fithria (2021)	Face to face focus groups	Thematic (inductive content analysis)	Smoking only	Indonesia no comprehensive ban	10+ years before
Fraga et al. (2011)	Face to face semi-structured interviews	Thematic (content analysis)	Smoking only	Portugal no comprehensive ban	0-4 years before
Haines et al. (2009)	Face to face semi-structured interviews	Thematic	Smoking and other substances	Canada (Toronto) 2015	0-4 years before
Hong et al. (2015)	Face to face semi-structured interviews and focus groups	Thematic (Colaizzi's method)	Smoking only	Taiwan 2009	After
Ioannou et al. (2010)	Face to face unstructured interviews	Thematic (content analysis/grounded theory)	Smoking only	Cyprus 2010	5-9 years before
Jafari (2022)	Face to face semi-structured interviews	Thematic (content analysis)	Smoking only	Iran 2007	After
Johnson et al. (2003)	Face to face semi-structured interviews (secondary analysis and primary data collection) + free pile and sort	Thematic	Smoking only	Canada (Vancouver) 2015	10+ years before
Lewis et al. (2003)	Ethnography	Thematic (open coding approach)	Smoking only	UK (England) 2007	After
Milton et al. (2008)	Face to face focus groups and semi-structured interviews	Thematic	Smoking only	UK (England) 2007	5-9 years before
Mishra et al. (2005)	Face to face focus groups	Thematic	Tobacco in various forms	India, no comprehensive ban	10+ years before
Mitschke et al. (2008)	Face to face focus groups	Thematic	Smoking only	Honolulu, Hawaii, USA 2006	0-4 years before
Mutaz (2020)	Face to face focus groups	Thematic	Smoking only	Saudi Arabia, no comprehensive ban	10+ years before
Niknami et al. (2008)	Face to face semi-structured interviews, focus groups and written narratives	Thematic (content analysis)	Smoking only	Iran 2007	0-4 years before
Nwafor et al. (2012)	Face to face focus groups	Not stated clearly	Smoking only	Nigeria no comprehensive ban	10+ years before
Perez-Milena et al. (2012)	Face to face focus groups	Content analysis	Smoking only	Spain 2011	0-4 years before
Peterson et al. (2019)	Face to face focus groups	Thematic (constant comparison)	Smoking only	Uruguay 2006	After
Plano Clark et al. (2002)	Face to face focus groups	Thematic	Primarily smoking, but also included smokeless tobacco	USA (Newbraska) 2009	5-9 years before
Plumridge et al. (2002)	Face to face focus groups	Thematic	Smoking only	New Zealand 2004	5-9 years before
Povlsen et al. (2018)	Face to face single sex focus groups	Thematic (content analysis)	Smoking only	Nepal 2011	After
Rothwell et al. (2011)	Face to face focus groups	Thematic	Smoking and chewing tobacco	USA (Utah) 2007	0-4 years before
Sanchez Martinez et al. (2008)	Face to face semi-structured interviews	Thematic (content analysis)	Smoking only	Mexico 2008	10+ years before
Schreuders et al. (2019)	Face to face focus groups and semi-structured interviews	Thematic (framework analysis)	Smoking only	The Netherlands 2008	After
Stewart-Knox et al. (2005)	Face to face semi-structured interviews	Thematic (content analysis/grounded theory)	Smoking only	UK (Northern Ireland) 2007	5-9 years before
Stjerna et al. (2004)	Face to face single sex focus groups	Thematic (inductive/discursive analysis)	Tobacco, including snuff	Sweden 2005	10+ years before

Talip et al. (2016)	Face to face focus groups	Thematic	Smoking only	Brunei 2017		0-4 years before
Tamvakas et al. (2010)	Face to face semi-structured interviews with small groups (2/3 people)	Thematic	Smoking only	Greece 2010		0-4 years before
Tohid et al. (2011)	Face to face focus groups and semi-structured interviews	Thematic	Smoking only	Malaysia 2019		10+ years before
Treacy et al. (2007)	Face to face focus groups and semi-structured interviews	Thematic analysis (inductive)	Smoking only	Ireland 2004		5-9 years before
Turner et al. (2006)	Face to face single sex focus groups	Thematic	Smoking only	UK (Scotland) 2006		0-4 years before
Vazquez et al. (2018)	Face to face focus groups	Thematic	Smoking only	USA (Texas) comprehensive ban	No	10+ years before
Woodgate et al. (2015)	Face to face semi-structured interviews, participatory method 'Photovoice' and focus groups	Thematic	Smoking only	Canada (Western Canadian Province, unclear which) 2004, 2005, 2008, 2008		After
Yuksel et al. (2005)	Face to face focus groups	Thematic and content analysis	Smoking only	Turkey 2009		10+ years before

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