Developing the evidence-base for gender and age-relevant school sex education; questionnaire findings from an adolescent sample using an augmented Theory of Planned Behaviour

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ABSTRACT

Background

Positive adolescent sexual health is supported by effective school based sex education. Methods to promote positive sexual health need to reflect determinants of contraception intention, which must include understanding gender and age (year group) differences. To date, there has been limited theory-based exploration of these determinants in school-age participants, placing limitations on sexual health educators to tailor learning most effectively.

Methods

Cross sectional survey data was collected from UK school pupils (N = 1378) aged 12-16 years. Measures included Theory of Planned Behaviour, Prototype Willingness, anticipated regret and knowledge items. Linear regression determined significant predictors of intention to use condoms, the oral contraceptive pill and emergency contraception (EC). *t*-tests and ANOVAs were used to assess differences by gender and school year.

Results

Three distinct predictive models emerged for condom, pill and EC, predicting 36%, 18% and 23% variance respectively. Attitude, gender and anticipated regret for unprotected sex significantly predicted intention for all types ($p<.001$). The influence of other explanatory variables differed by contraceptive. Girls scored higher on all variables except condom intention, and intention scores peaked in year 10.

Conclusion

Condoms, pill and EC intention have different predictive profiles, with girls more strongly motivated and year 10 a crucial stage for intention. Social comparisons and control beliefs exert differential effects across contraceptive types whilst attitudes and anticipated regret are consistently strong influences. Findings suggest clear scope for supporting sexual health and wellbeing through modified school sex education.

KEYWORDS

Adolescence, sexual health, sex education, theory, intervention, contraception

BACKGROUND

Internationally, reducing rates of adolescent conception and childbearing is a major public health priority[1]. Whilst the UK under-18 conception rate has reduced by 40.8% since 1969[2], 45.2% of 16-19 year old pregnancies are still unplanned[3]. Sexually transmitted infections (STIs) also continue to increase and young people aged 16-24 years are at most risk of infection[4]. Teenage Pregnancy (TP) and STI reduction therefore remain part of the UK Government's public health strategy[5, 6] to ameliorate the associated negative social and health implications[7-11], presenting clear opportunities for promoting behaviour change.

School based sex education remains the primary source of contraceptive and sexual health information for many young people[12]. Evidence suggests a positive relationship

between school sex education and delay of sexual debut, likelihood of protected sex and – for females – lower likelihood of unplanned pregnancy[3] and non-consensual activity[13]. However, recent assessments[14] have criticised the quality and effectiveness of sex education, identifying the need for improvement in more than one third of UK schools. With abstinence-only sex education programmes proving ineffective, arguably successful provision requires comprehensive, theory and evidence-based approaches addressing the complexity of sexual behaviour[15-17] and taking account of important determinants of contraceptive use.

Within a large body of health behaviour frameworks, the Theory of Planned Behaviour[18] (TPB) has shown particular utility in predicting safer sex behaviours[19, 20], including in adolescent samples[21]. Briefly, the theory proposes that intention is the primary mediator of behaviour, which itself is determined by attitudes (ATT; beliefs about the merits of a specified action), subjective norms (SN; perceptions about what important others think you should do) and perceived behavioural control (PBC; appraisal of ones' own ability to act). PBC may also exert direct influence on behaviour to the extent that perceptions about control reflect actual control and bypass intentions. However in recent years the utility of the TPB in its standard form has been called into question[22]. Within teen sexual behaviour, the complex interplay of social factors[23], situational influences[24, 25] and biases in adolescent cognition[26] challenges the applicability of such rational approaches. The inclusion of more socially reactive paths such as those posited in the Prototype Willingness model[27] (PWM) have been empirically supported in a range of risk behaviours[28, 29] including engaging in safe sex[30, 31]. In PWM, likelihood of action is influenced by (i)favourability of judgements about those who engage in a specific behaviour (*prototype evaluation*), (ii) degree of

perceived likeness to such individuals (*prototype similarity*) and (iii) the combination of these factors (*prototype interaction*). Evidence also suggests that PWM can add to the predictive power of the TPB[32-34]. Likewise, anticipated regret (AR) - which taps into future concerns about consequences of either performing or *not* performing a behaviour - has been shown to have a direct and independent influence on risk behaviour[35], beyond simply contributing to the attitude construct to which it is closely aligned[36]. Extending an individual's time perspective (anticipation) and focusing on affective sequalae (regret) has been demonstrated to have an inhibiting effect on sexual risk taking[37], and thus suggest that AR may offer an appropriate augmentation of the TPB.

Within a range of contraceptive options – including long acting reversible contraceptives such as the implant or injection – adolescents opt for condoms, the contraceptive pill (hereon referred to as 'pill') and the emergency contraceptive pill (EC)[38] most frequently. Safe sex thus depends on adolescents' ability to use contraception which is more personally *effortful* in nature. Understanding determinants of such behaviour ahead of widespread sexual debut is vital[39] to optimise the impact of education. Such actions necessarily differ by gender and are dependent upon sufficient knowledge and understanding. As school sex education is frequently taught within school year groups, educators thus face substantive challenges in delivering individualised content in this context, and require a sufficient and robust evidence base to do so.

However, at present it is unclear (i) which determinants most strongly predict condom, pill and EC intention, and (ii) how sex education should be tailored accordingly for

boys and girls in school-year group settings. This study therefore extends the TPB[40] with PWM, AR and knowledge about contraception and sexual health to explore comparative contraceptive intentions and assess the influence of gender and school year. The sample is drawn from UK school years 8 (12-13 year olds) to year 11 (aged 15-16). The research questions are:

1) What are the salient and comparative determinants of condom, pill and EC intentions?
2) To what extent are intentions for each method correlated?
3) How do determinants differ by gender and school year?
4) How may sex education need to be tailored to accommodate gender and year group differences and enhance sexual health?

METHOD

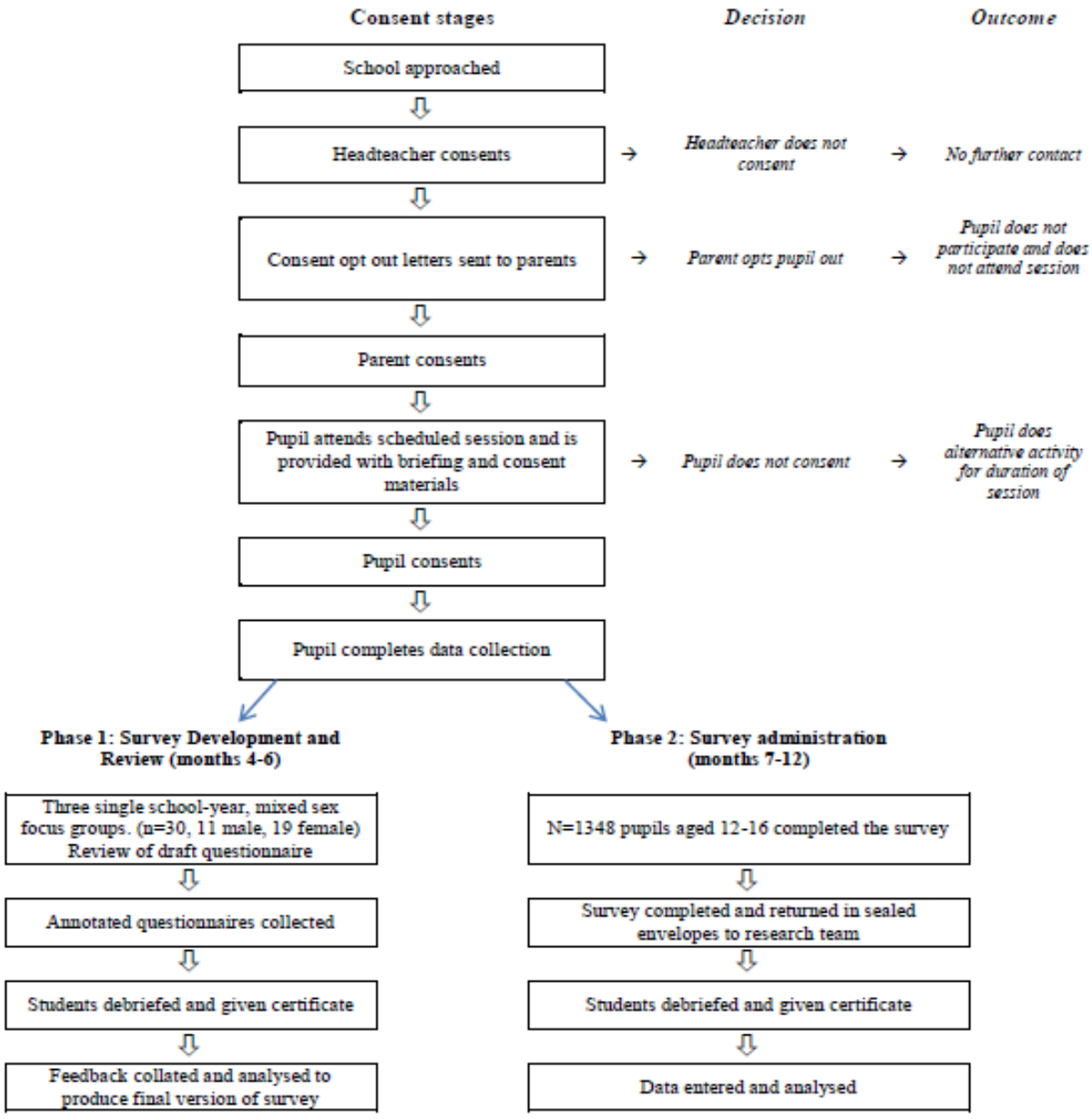
This study involved two phases:

1. Survey development and review
2. Survey administration

Consent process

This study was approved by Coventry University Ethics Committee. Consent in each phase followed the same process and is summarised alongside data collection processes in Figure 1.

Figure 1: Summary of Consent and Data Collection Processes for Each Phase.



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149 **Phase 1: Survey development and review**

150 A draft questionnaire was produced based on published literature and best practice for

151 TPB survey development[41, 42]. This was reviewed by thirty school pupils (15 male, 15

152 female) from two local secondary schools to assess survey item appropriateness and

response elicitation effectiveness. Year specific focus groups, each consisting of only year 9, 10 or 11 pupils were run, with male and female students split equally (5 males and 5 females) between them. Pupils commented verbally and annotated a printed copy of the survey. Feedback from each group was collated and analysed to inform the development of the final questionnaire. Pilot testing highlighted a series of revisions needed, including simplifying language such as replacing *'intend'* with '*plan*' and '*want*' to improve comprehension of intention measures. A final version of the survey was produced for phase 2.

Phase 2: Survey administration

Participants

Power calculations (using G Power 3.0.10, holding α at .05, with power at .95, and taking account of the number of predictor variables) determined that a final sample of 863 participants was required to detect a small effect in the data. Three schools, consisting of one mixed comprehensive and two single sex schools (one male one female) and with similar profiles of ethnicity and (average) academic attainment were recruited, This resulted in a total of 1348 pupils participating.

Measures

All items were presented with female/male specific variants where appropriate. Data were (re)coded so that higher scores reflect more positive/self-protective responses.

TPB variables

All TPB variables were measured in relation to condom behaviour ("use condoms every time I have sex"), pill use ("take / rely on my girlfriend to take the contraceptive

pill regularly to prevent pregnancy") and use of EC ("take / rely on my girlfriend to take emergency contraception ('morning after pill') after unprotected sex to prevent pregnancy").

Intention (INT) for each contraceptive was constructed from the mean of two items: "I plan to [behaviour]" and "I want to [behaviour]". Responses to all items were on 7-point Likert scales ranging from *"strongly disagree"* to *"strongly agree".* Cronbach's alpha scores showed good internal consistency for condoms (α=.901), pill (α=.703) and EC (α=.893).

Attitude (ATT) for each contraceptive was constructed from the mean of four 7-point bipolar scales using the endpoints (i)"good" to "bad", (ii)"pleasant" to "unpleasant", (iii) "enjoyable" to "unenjoyable" and (iv) "silly to sensible"). The format for each item was "How [endpoints] do you think it would be for you to use [contraception]? Cronbach's alpha scores showed satisfactory internal consistency for condoms (α=.636), pill (α=.622) and EC (α=.567).

Subjective norms (SN) for each contraceptive were measured by responses to the item "Overall, how much do you think people would approve or disapprove of you using [contraception]". Responses were given on 7 point scales *("strongly disapprove"* to *"strongly approve"*).

Perceived behavioural control (PBC) for each contraceptive was measured respectively by responses to the items "I am confident that I can use a condom every time I have sex", "I am confident that I/my partner could remember to take the contraceptive pill at

the same time each day" and "I am confident that I/my partner could take the emergency contraceptive pill after unprotected sex". Responses to all items were on 7-point Likert scales ranging from *"strongly disagree"* to *"strongly agree".*

Prototype Willingness variables

Prototype evaluation (PE) was assessed with the question "How much do each of the following words describe the type of teenage girl who gets pregnant/teenage boy who gets a girl pregnant?" (answered by girls and boys respectively). This was followed by a series of descriptors (careless, immature, confused, intelligent, brave, self-confident, popular, cool, lucky, sophisticated). Respondents provided ratings on 5 point unipolar scales from "not at all" to "very much". Positive descriptors were reverse scored so higher scores reflect *unfavourable* opinions and a mean overall score was calculated.

Prototype similarity (PS) was assessed by the response to the item 'In general, how similar are you to the type of girl who gets pregnant / boy who gets a girl pregnant?' on a 7-point unipolar scale *("very similar"* to *"not at all similar to me"*). Higher scores indicated perceived *dis*similarity to pregnant teens.

Prototype interaction (PI) was constructed from the product of PE and PS.

Anticipated regret

Anticipated regret was measured by two separate items: Anticipated regret for unprotected sex (AR-UPS) was assessed by response to the question "If you had sex and did not use contraception, how much do you think you would regret it the next day?". Anticipated regret for a resultant pregnancy (AR-Preg) was assessed by

response to the item "If you had sex and did not use contraception, how much do you think you would regret it if you then found out that you or your partner were pregnant?" Responses to both were on 5 point scales (*"not at all"* to *"completely regret"*).

Knowledge

Knowledge was measured by summing the total number of correct answers to 14 questions on contraceptive use (e.g. "How long after unprotected sex is the emergency contraceptive pill effective?"), STIs (e.g. "Which of the following do you think are possible consequences of getting a sexually transmitted infection") and general sexual risk (e.g "True or false - Sperm can be released from the penis before ejaculation?")

Procedure

All schools opted for paper (vs. web) administration. Following headteacher approval, parents were sent opt-out consent letters. No students were withdrawn. Researchers attended specified classes, briefed pupils verbally and in writing and obtained informed consent. Those choosing not to participate were given an alternative activity. Completed questionnaires were placed in sealed envelopes and data was processed in accordance with the Data Protection Act 1998. Data from paper questionnaires were hand entered into a statistical database (SPSS 20) and screened to ensure all points were correctly entered.

Analysis

Following descriptive analysis, multiple linear regression was conducted to assess predictive models of intention for each contraceptive type. *t*-tests were applied to assess variable differences by gender, and ANOVAs for differences by school year.

RESULTS

Descriptive analysis

Table 1 provides full demographic details of the sample. Most respondents were female (66.7%), White British (81.1%), lived in two-parent households (68.5%) and had received sex education at school (90.5%)

Table 1: Respondent Characteristics

Characteristic	Response	Freq	%
Gender	Male	448	33.2
	Female	899	66.7
School year	8	324	18.8
	9	396	22.9
	10	244	14.1
	11	382	22.1
Ethnicity	White British	1093	81.1
	Pakistani (Asian / British Asian)	90	6.7
	Indian (Asian / British Asian)	29	2.2
	Mixed heritage	26	1.9
	Other	22	1.6
	Asian other / Asian mixed	19	1.4
	African (Black / Black British)	16	1.2
	Caribbean (Black / Black British)	15	1.1

	Black other / Black mixed	11	0.8
	White other	11	0.8
	Bangladeshi (Asian / British Asian)	5	0.4
Household	Single parent	413	30.6
	Dual parent	923	68.5
Had sex education at school	Yes	1220	90.5
	No	64	4.7
	Don't know	56	4.2

Mean scores for all TPB items were at least 1.5 points above the scale mid-point of 3, showing total INT (4.94), ATT (4.91), SN (5.03) and PBC (4.79) were positive. Mean anticipated regret scores were higher than the 5 point scale midpoint for both items, with AR-UPS slightly above (3.70) and AR-Preg over one point higher (4.06). Prototype evaluation scores were only marginally above the scale midpoint (3.56), showing a small tendency towards viewing pregnant teens unfavourably. In contrast, mean scores for prototype similarity were much higher than the 7-point scale midpoint showing participants judge themselves as largely dissimilar from pregnant teens (mean 5.15).

Regression analysis

Multivariate linear regression analysis was employed to build three models (condom, EC and pill). These explored the relationship between explanatory variables (ATT, PBC, SN, AR-UPS, AR-Preg, prototype evaluation, prototype similarity, prototype interaction, gender, school year) and intention to use each contraception. First, a full specification regression model was built for each of the three dependent variables.

Both the significant and insignificant variables were reported along with the Adjusted R^2 and F statistic measures of model fit. Regressions were then run with reduced samples.[43] A stepwise procedure was employed to identify the final models (see table 2).

Table 2: Final Stepwise Regression Models for Condom, Pill and EC intention

	CONDOM	PILL	EC
ATT	0.413 (6.23)**	0.454 (6.48)**	0.524 (7.25)**
PBC	0.212 (5.48)**	0.089 (2.09)*	
SN		0.169 (3.79)**	0.187 (4.46)**
Gender	0.757 (6.52)**	0.345 (2.48)*	0.371 (2.51)*
Year 11	0.214 (2.04)*		
Year 10	0.400 (3.48)**		
Prototype Interaction	0.020 (2.91)**	0.024 (2.37)*	
Prototype Similarity		-0.265 (2.07)*	
AR (UPS)	0.316 (7.06)**	0.151 (2.87)**	0.177 (2.86)**
AR (Pregnancy)			0.175 (2.79)**
Constant	-0.156 (0.47)	0.995 (1.93)	0.086 (0.22)
R^2	**0.36**	**0.18**	**0.23**
N	792	735	669

*Significant at .05
**Significant at .01

Attitude was a significant predictor of intention for all contraceptive types. Gender also significantly predicted intention for all contraceptive types, as did AR-UPS. Neither prototype evaluation nor knowledge significantly predicted intention for any contraceptive type.

For condoms, PBC, Prototype Interaction, AR-UPS and higher school years further significantly predicted intention. Taken together these determinants predicted 36% variance in condom intention.

For the pill, both PBC and SN added significantly to prediction of intention, with SN providing the greater effect of the pair. Prototype Interaction had a significant effect at the same order of magnitude as for condoms. AR-UPS added to the predictive model (at around half the magnitude for condoms), with Prototype Similarity contributing in a negative direction. In total, the significant determinants predicted 18% variance in pill intention.

For EC intentions, SN, AR-UPS and AR-Preg significantly added to the predictive model and predicted 23% of the variance.

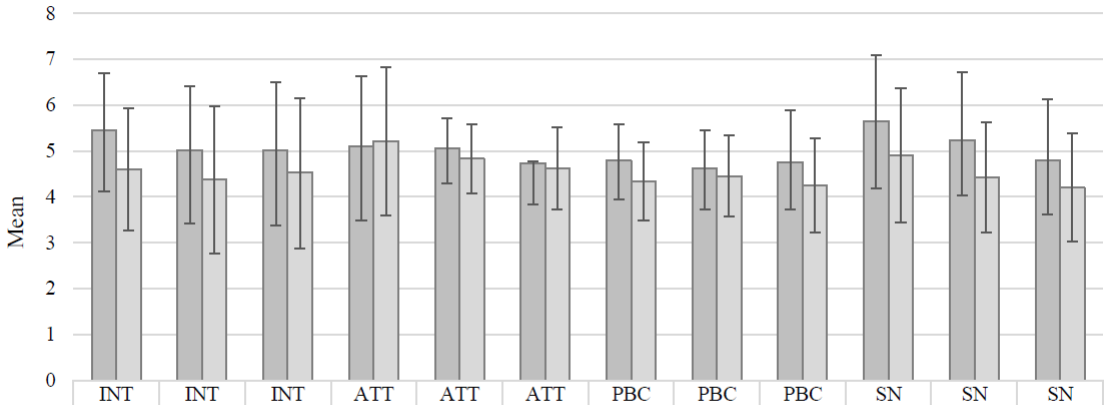
Correlation between intentions

A Pearson product-moment correlation coefficient was computed to assess the relationship between intentions for all contraceptive types. Analysis showed significant correlations between intentions for all pairs; Condoms and pill, $r(1275)=.405$, $p<.001$; Condoms and EC, $r(1272)=.360$, $p<.001$; pill and EC, $r(1272)=.625$, $p<.001$.

Analysis of determinants by gender

Mean scores for all items - except condom attitudes - were more positive in females. Figure 2 provides mean and standard deviation scores for all TPB items by gender.

Figure 2: TPB Variable Means and Standard Deviations by Gender



	INT Condom	INT Pill	INT EC	ATT Condom	ATT Pill	ATT EC	PBC Condom	PBC Pill	PBC EC	SN Condom	SN Pill	SN EC
Female	5.455	5.0205	5.0176	5.098	5.0509	4.7345	4.7877	4.6197	4.7503	5.6448	5.2342	4.7912
Male	4.5988	4.3735	4.5223	5.2176	4.8354	4.6238	4.3386	4.4516	4.2459	4.9021	4.4206	4.1953

Independent t-tests were used to compare determinants by gender. Results showed a significant effect for gender on intention to use all three contraceptives with females scoring more highly throughout: condoms, $t(1295) = 8.967$, $p<.001$; pill, $t(1277)= 5.789$, $p<.001$; EC, $t(1276) = 4.634$, $p<.001$.

T-tests also showed significant gender differences in attitudes to condoms, with attitudes more positive in boys; $t(1223)=-2.178$, $p=.030$). Attitudes to the pill also differed significantly by gender; $t(1166)=3.905$, $p<.001$ with pill use attitudes more positive in girls. No significant attitude differences were found by gender for EC.

Gender differences in PBC were found for condoms ($t(1205) = 3.850$, $p<.001$) and EC ($t(1189)=4.561$, $p<.001$), with scores higher for females for both. No significant differences were found for pill attitudes by gender.

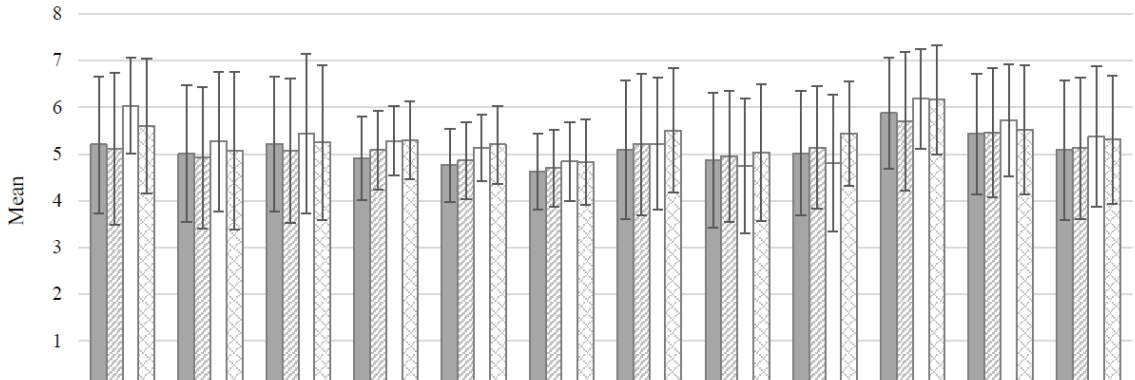
Gender differences in SN were found for condoms ($t(1215) = 6.816$, p<.001), pill ($t(1217)=7.867$, p<.001) and EC ($t(1215)=5,432$, p<.001). Mean SN scores were higher in females for all contraceptive types.

Gender differences were also found in all other variables, with mean scores higher in females throughout: prototype evaluation (female $m=3.6$, $sd=.513$; male $m=3.47$, $sd=.622$; $t(1167)=3.905$, p<.001), prototype similarity (female $m=5.41$, $sd=1.57$; male $m=4.64$, $sd=1.68$; $t(1316)=8.108$, p<.001), prototype interaction (female $m=19.65$, $sd=6.82$; male $m=3.87$, $sd=1.13947$; $t(1146) = 7.305$, p=000), AR-UPS (female $m=3.87$, $sd=1.14$; male $m=3.27$, $sd=1.33$; $t(1068)=7.389$, p<.001), AR-Preg (female $m=4.21$, $sd=1.08$; male $m=3.69$, $sd=1.35$; $t(1146)=7.305$, p<.001) and knowledge (female $m=9.65$, $sd=2.34$; male $m=8.93$, $sd=2.24$; t(1250)=5.190, p<.001).

Analysis of determinants by school year

Figure 3 provides mean and standard deviation scores for all TPB items by school year.

Figure 3: TPB Variable Means and Standard Deviations by School Year



	INT Condom	INT Pill	INT EC	ATT Condom	ATT Pill	ATT EC	PBC Condom	PBC Pill	PBC EC	SN Condom	SN Pill	SN EC
Yr8	5.1986	5.0103	5.2123	4.9092	4.7603	4.613	5.0959	4.863	5.0137	5.8699	5.4315	5.089
Yr9	5.106	4.924	5.0668	5.0829	4.8571	4.6993	5.1982	4.9493	5.1382	5.7051	5.4608	5.1244
Yr10	6.026	5.2656	5.4375	5.276	5.125	4.8359	5.2188	4.7396	4.8125	6.1771	5.7188	5.3646
Yr11	5.5981	5.0696	5.2437	5.2991	5.1978	4.8196	5.5	5.038	5.4367	6.1582	5.519	5.3101

Intention

ANOVA results showed that only intention to use condoms differed significantly by school year, $F(3,1292)=9.672$, $p<.001$. Pill and EC intentions did not significantly differ. Post hoc analysis indicated that condom intention differed between years 8 and 10 ($p=.002$), and year 9 and 11 ($p=.002$) rather than between sequential years. Intention for all contraceptives was highest in year 10.

Attitude

Attitudes for all contraceptives differed significantly by school year: condoms, $F(3,1220)=9.415$, $p<.001$; pill, $F(3, 1163)=19.610$, $p<.001$; EC, $F(3, 1037)=5.797$, $p=.001$. There was a linear upwards trend, with attitudes becoming more positive in higher years for all contraceptives, with only EC intentions highest in year 10. Post hoc tests showed that condom attitudes differed between 8 and 10 ($p=.01$) and 9 and 11 ($p=.013$). Pill attitudes differed significantly between years 10 and 11 ($p=.045$) and EC between years 8 and 9 ($p=.027$).

Perceived Behavioural Control

PBC differed significantly by school year for all contraceptives: condoms, $F(3,1202)=16.108$, $p<.001$; pill, $F(3,1190)=11.396$, $p<.001$; EC, $F(3,1186)=22.582$, $p<.001$. For pill and EC, PBC differed between years 10 and 11 ($p<.05$) and for all types scores differed significantly between years 9 and 10. PBC was highest for all contraceptives in year 11 and EC and pill scores lowest in year 10.

Subjective norms

SN for each contraceptive differed significantly by school year: condoms, $F(3,1212)=7.892$, $p<.001$; pill, $F(3,1214)=10.311$, $p<.001$; EC, $F(3,1212)=7.957$, $p<.001$. For each type, SN differed significantly between years 9 and 10 ($p<.01$), with SN scores highest in year 10.

Prototype similarity differed significantly by school year (year 8 *m*=5.62, *sd*=1.5; year 9 *m*=5.18, *sd*=1.47; year 10 *m*=5.34, *sd*=1.58; year 11 *m*=5.24, *sd*=1.61; $F(3,1313)=4.223$, $p=.006$. Similarity ratings differed significantly between years 8 and 9 ($p>.01$) with highest ratings in the former and lowest in the latter. Prototype evaluation did not significantly differ by school year.

Anticipated regret for both unprotected sex and pregnancy differed significantly by school year: AR-UPS (year 8 *m*=3.70, *sd*=1.21; year 9 *m*=3.63, *sd*=1.18; year 10 *m*=4.02, *sd*=.99; year 11 *m*=3.82, *sd*=1.15; $F(3,1065)=5.573$, $p=.001$), AR-Preg (year 8 *m*=4.04, *sd*=1.11; year 9 *m*=3.99, *sd*=1.15; year 10 *m*=4.37, *sd*=.99; year 11 *m*=4.24, *sd*=1.06; $F(3,1064)=6.951$, $p<.001$). Scores for both AR-UPS and AR-Preg differed significantly between years 9 to 10 ($p<.005$) and were highest in year 10. For AR-UPS scores also significantly differed between years 10 and 11 ($p<.05$).

Gender and school year differences in knowledge

ANOVA showed knowledge was significantly higher in progressive years (year 8 *m*=8.54, *sd*=2.16; year 9 *m*=8.95, *sd*=2.45; year 10 *m*=9.92, *sd*=2.45; year 11 *m*=10.21, *sd*=2.12; $F(3,1247)=39.388$, $p<.001$). Mean knowledge scores were higher for girls throughout, with the male-female difference broadly increasing over time (female means higher by 0.23, 0.36, 1.19 and 1.17 in years 8-11 respectively)

DISCUSSION

To our knowledge this is the first study to comparatively assess 12 to 16 year-olds' intentions to use three contraceptive types, using an extended TPB. The three models successfully predicted 36%, 18% and 23% of variance in intention to use condoms, pill and EC respectively. Although there are strong correlations between intentions for each contraceptive method, our results show three distinct predictive models, with only gender, attitude and anticipated regret for non-use of contraception common to all three. Results suggest there is scope to increase intention towards each contraceptive by targeting their respective determinants within school sex education. These findings offer evidence for enhancing sexual health through tailored sex education, and support arguments for extending rather than retiring the TPB[40].

Scores for all variables were highest in relation to condoms (followed by pill and EC), corresponding with evidence on adolescent contraceptive preferences[38]. Results support existing literature that attitude[20, 44-48], SN[21, 44, 45, 47, 49] and PBC[25, 46] are significant influences on contraceptive intention. With condoms arguably the most behaviourally complex of the three methods, requiring both preparatory action (access and carrying) and situation-specific interaction (negotiation and correct use)[50], control beliefs understandably elicit a strong effect[25]. In contrast, perceived control is a weak or null predictor of pill and EC intention respectively. Instead, normative influences emerge as an important correlate of pill and EC intention, suggesting that for female-specific contraceptives, motivation is influenced by what they believe important people

422 in their lives think they should do. Strengthening normative beliefs amongst girls may
423 therefore be particularly useful for enhancing contraceptive intentions and use.
424
425 In line with Ajzen's espousal of evidenced extensions to the TPB[51], the additional
426 predictive power of prototype willingness items suggests these tap into attributes of
427 normative beliefs beyond standard measures of subjective norms. Overall however
428 neither perceived dissimilarity to teenagers who get pregnant/teenage boys who get
429 girls pregnant nor unfavourable judgements alone were sufficient to prompt intention
430 to use condoms. Furthermore in contrast to expectations[52], for pill intentions there is a
431 small but significant negative relationship between intention and the specific measure
432 of prototype similarity. Judging oneself as similar - rather than dissimilar - to a typical
433 teenager who gets pregnant (or gets a girl pregnant) is related to increased motivation
434 to take the pill. A stronger sense of similarity may be a proxy assessment of likely risk
435 of pregnancy triggering a stronger protective response of intention to take the pill.
436 There may therefore be merit in increasing perceived similarity to pregnant teens and
437 an understanding of risk to trigger protective intentions.
438
439 Whilst anticipated regret for unprotected sex underpinned intention for all
440 contraceptives, regret for pregnancy was uniquely predictive of EC intentions. A likely
441 explanation is that with adolescent thinking biased towards optimism and
442 invulnerability[53], severe consequences may be deemed unlikely until such time as they
443 become a viable possibility. Thus, whilst there is general value in eliciting feelings of
444 regret for unsafe sex, it may also be advisable to draw distal (pregnancy) outcomes
445 more closely into adolescent consciousness to promote preventive action.
446

Whilst results suggest a linear increase in knowledge and stepwise changes in PBC and SN in later school years, overall there is a more disjointed progression in contraceptive intention. Furthermore, with school year significant only for condoms, increasing age is not automatically matched by incremental improvements in contraceptive intent. The most conspicuous deviation from linearity is the prominence of year 10 (ages 14-15 years) across scores. Intention and SN for all contraceptive types peak at this point, with a similar pattern for anticipated regret. This suggests a qualitative difference in adolescents' consideration of contraception in year 10, not consistently maintained into year 11. Conversely PBC drops in year 10, suggesting that at this age stronger norms and social reference are coupled with a reduced sense of personal efficacy. Interventions to improve confidence may therefore be particularly valuable at this stage.

Limitations

A key limitation of this study for guiding sex education content is that it focuses solely on heterosexual sex and contraceptive use. The work extends from a longer standing body of work to support the Teenage Pregnancy Strategy, resulting in a comparative focus on the three most common adolescent contraceptive choices. As two of these are used for pregnancy prevention only – and are thus heterosexual –this has the effect of leaving non-heterosexual sexual health largely unaddressed. The predominantly White British sample may limit generalisability across cultures, especially for those with different norms for adolescent contraception. However, our sample was broadly representative of ethnic diversity within the UK: White British in our survey constituted 81.8% of the sample (compared to 86% in the 2011 UK census[54], Asian constituted 10.7% (vs. 7.5%), Black 3.3% (identical to the UK profile), Other 1.6% (vs

1%) and Mixed 1.9% (vs. 2.2%). The sample also mirrors the national pattern[55] of children living in dual parent (approximately two thirds) or lone parent (one third) households. Thus, whilst the England-specific sample may limit generalisability for international curriculum development, it appears suitably representative to draw national (UK) conclusions and offer insights beyond. The higher proportion of females in the sample requires caution in drawing concrete gender comparisons, albeit the large sample size ameliorates this concern. Future research needs to address four main issues. Firstly, we firmly advocate the need for improved understanding and support for the sexual health of LGBTQ young people, extending beyond simple comparisons of primary contraceptive options. Secondly, despite a large sample size, this cross-sectional approach precludes conclusions of the progressive nature of change across school years. Whilst such developments are implied by the data, further longitudinal data is required for firmer conclusions about the nature of maturing cognitions. Thirdly, with intention (not behaviour) the outcome measure of this research, there is need to understand how patterns identified here translate into contraceptive action and ultimately safe sex outcomes. Finally, further research must examine the emerging hypothesis that year 10 is a tipping point for adolescent cognitions about contraception use.

Conclusions

This study shows three specific profiles for condoms, pill and EC intention, with girls more strongly motivated and year 10 a crucial stage for cognitive engagement. Attitudes and anticipated regret for having unprotected sex are consistently strong influences on intention, whilst social comparisons and control beliefs exert discrete

effects for different contraceptives. There is clear scope and benefit in modifying school sex education delivery accordingly to enhance adolescent sexual health.

Implications for sexual health

This research highlights several implications for improving sexual health through more effective and tailored school sex education. First, with knowledge alone insufficient to prompt intention, it is essential that education addresses the identified socio-cognitive factors which are amenable to change. More specifically lesson content should incorporate messages designed to (i) enhance overall contraceptive attitudes through strengthening positive beliefs (and/or reducing negative beliefs), (ii) improve perceived control for condoms and the pill and (iii) prompt positive norms and social comparisons for the pill. Second, boys must be supported to build stronger intentions towards contraception, even those forms for which they do not have primary control such that these behaviours can be reinforced within relationships. Third, with year 10 emerging as such a significant stage, efforts should be focused on strengthening cognitions at this point and reinforcing control beliefs to maintain this effect into future years. Whilst contraceptive intention generally increases with age, education must start early enough to establish positive attitude, control and normative foundations ahead of sexual debut. Fourth, with clear models emerging for each contraceptive type, interventions must draw on established techniques and taxonomies for modifying determinants. In accordance with best practice such as Intervention Mapping[56], the most effective provision would be a combination of the evidence base for differing determinants, proven techniques for changing socio-cognitive variables[57, 58], and educator experience in delivering learning. Through this integrated approach, young people can be better equipped to develop strong intentions to use contraception,

underpinning subsequent positive choices and positive sexual health. Strategic commitment will be needed to resource such approaches, reflect non-heterosexual activity, and enable integration into an already pressured curriculum.

Conflicts of interest

The authors have no conflicts of interest.

FUNDING AND ACKNOWLEDGEMENTS

This study was funded by Bayer Healthcare. The authors would like to thank participating schools and pupils, and Alison Baxter for support with data collection.

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