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# A causal model of contraceptive intention and its gender comparison among Taiwanese sexually inexperienced adolescents

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**A causal model of contraceptive intention and its gender comparison among Taiwanese sexually inexperienced adolescents**

**Aims and objectives.** To test latent constructs of social influences, contraceptive attitude and self-efficacy for contraception as a causal model of contraceptive intention among adolescents and to search for possible gender differences in the causal model of contraceptive intention.

**Background.** A greater understanding of the causal model of contraceptive intention among sexually inexperienced adolescents will help nurses design contraceptive programmes to improve adolescent contraceptive use when they have sex.

**Design.** This was a cross-sectional study; 770 boys and 685 girls that self-reported not being sexually experienced were selected for this study.

**Methods.** An anonymous questionnaire was used to collect data. By structural equation modelling using the EQS 6.1 software, a hypothesized structural model of contraceptive intention was tested.

**Findings.** For both genders, social influences affected contraceptive intention indirectly through the contraceptive attitude and self-efficacy for contraception. Contraceptive attitude and self-efficacy for contraception affected contraceptive intention directly. Contraceptive attitude also affected contraceptive intention indirectly through the mediation of self-efficacy for contraception. There were gender differences in the variances of contraceptive intention explained by contraceptive attitude, self-efficacy for contraception and social influences. Nevertheless, the data explain only a low proportion of the variability in contraceptive intention. More causal constructs influencing contraceptive intention should be explored in future.

**Conclusions.** Personal factors and social influences operate interdependently to influence contraceptive intention among sexually inexperienced adolescents. Gender is a moderator that can modify the influential level of social influences, contraceptive attitude and self-efficacy for contraception on contraceptive intention.




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**Relevance to clinical practice.** Nurses should operate personal factors and social influences interdependently when they are designing intervention programmes for sexually inexperienced adolescents. To make intervention more effective, nurses also need to provide gender-specific intervention programmes for sexually inexperienced adolescents.

**Key words:** adolescents, causal model, contraceptive intention, nurses, nursing, structural equation modelling

## Introduction

There are fewer sexually active adolescents in Taiwan than in western countries. However, under the impact of globalization, Taiwanese society is also facing the problem of increasing prevalence of sexually active of adolescents and adolescent pregnancy. The birth rate of female adolescents represents only 50% of adolescent pregnancies because of unreported birth or terminated pregnancy in Taiwan (Chang *et al.* 1996). Although in an official report in 2005, 10 of 1000 girls aged 15–19 years give birth each year in Taiwan (Department of Health 2006), the pregnancy rate is at least twice that of the birth rate among adolescents in Taiwan. Preventing unexpected pregnancy among adolescents, therefore, is an important issue for healthcare providers in Taiwan.

Practicing contraception can be effective in preventing unexpected pregnancy when adolescents become sexually active. Improving contraceptive intention of sexually inexperienced adolescents before their involvement in sexual activities could be an important primary strategy to prevent unexpected pregnancies. Behavioural intention, based on the Theory of Reasoned Action (TRA), could be the best single predictor for personal behaviour (Ajzen & Fishbein 1980). A meta-analysis demonstrated that condom use intention is highly correlated with condom use (Albarracin *et al.* 2001). Accordingly, contraceptive intention can predict future contraceptive practice. Many previous studies have addressed factors influencing contraceptive behaviour among sexually active adolescents; however, few have addressed the issue of contraceptive intention among sexually inexperienced adolescents, especially Taiwanese adolescents. Nurses play a vital role within sexual health services and are in a position to influence adolescent sexual health positively (Metcalfe 2004). A greater understanding of the causal model of contraceptive intention among sexually inexperienced adolescents will help nurses to design contraceptive programmes to improve adolescent contraceptive use when they have sex.

## Background

Adolescents' contraceptive decisions have been considered to be made through a rational process (Weisman *et al.* 1991) and they are influenced by multiple factors. According to the TRA (Ajzen & Fishbein 1980), a person's intention is determined by attitude towards the behaviour and social influences. Attitude towards behaviour reflects an individual's beliefs about performing such behaviour. Attitude was a significant predictor of the intention to use condoms among adolescents (Villarruel *et al.* 2004, Koniak-Griffin & Stein 2006). A previous study of Taiwanese adolescents found that attitude towards contraception was an important explanatory factor for contraceptive intention (Wang *et al.* 2004).

In TRA (Ajzen & Fishbein 1980), social influences are the persons' perceptions of the social pressures put them to perform or not perform the behaviour, which are termed subjective norms. Subjective norms express the persons' perceptions of whether relevant others think they should or should not perform the behaviour, which are considered to be injunctive social norms. However, there is an important distinction in the literature on social influences between injunctive and descriptive social norms (Cialdini *et al.* 1991). Descriptive norms refer to perceptions of other people's behaviour. When exploring the effect of social influences on behaviour intention, injunctive and descriptive social norms should be considered simultaneously.

Adolescents are in a life stage where they often identify with their peers. The perceptions of peers' behaviours can be considered as descriptive norms. Previous studies have shown that the perceptions of peers' contraceptive behaviour were significantly correlated with contraceptive intentions among adolescents (Whitaker & Miller 2000, Wang *et al.* 2004). Adults, such as parents, teachers and school nurses, are important persons for adolescents because they can exert pressure on their behaviours. Parental approval was a significant predictor of condom use intention among adolescents (Jemmott *et al.* 2002, Villarruel *et al.* 2004). Perception of support from significant others is an important predictor

 

for contraceptive intention among male adolescents (Wang *et al.* 2004).

Self-efficacy, a judgement of one's ability to accomplish a certain level of performance in executing a specific behaviour, is considered the most proximal personal factor of behaviour (Bandura 1997). Previous studies have shown that self-efficacy relates to contraceptive intention (Wang *et al.* 2004) and condom use intention (Villarruel *et al.* 2004). Self-efficacy is the best predictor of intended condom use among sexually inexperienced adolescents (Baele *et al.* 2001). Although self-efficacy and attitude both correlate with intention, few studies have addressed the causal direction between them. Some people may have positive attitudes towards contraception but low self-efficacy because they find contraceptives difficult to use when they become highly aroused. A previous study also supported the assertion that the relation between attitude and intention could be mediated by self-efficacy (Wulfert & Wan 1993). Accordingly, contraceptive attitudes might predict contraceptive intention indirectly through the mediation of self-efficacy for contraception.

Although the TRA identifies attitudes and social influences as independent predictors of intention, some studies identified social influences correlated with attitude and self-efficacy. A previous study found that subjective norms were positively correlated with self-efficacy and prevention beliefs of condom use among adolescent mothers (Koniak-Griffin & Stein 2006). In the study of Taffa *et al.* (2002), social influences positively correlated to attitude and self-efficacy for condom use of adolescents. Social influences could be considered as a social context which can influence personal factors. It is plausible that social influences might affect contraceptive intention indirectly through the effects of contraceptive attitude and self-efficacy for contraception.

In general, research in the area of sexual behaviour shows gender differences among adolescents. Male adolescents held stronger views regarding barriers to contraceptive use (Pesa *et al.* 2001) and they had lower levels of intention than female adolescents (Baele *et al.* 2001). Female adolescents scored higher peer norms for safer sex and self-efficacy for condom use (Murphy *et al.* 1998) and they discussed contraception with peers more frequently than male adolescents (Hansen & Skjeldestad 2003). Additionally, females were influenced more frequently by family factors while males were influenced more by individual factors (Werner-Wilson 1998). These findings confirm that there are gender differences in contraceptive intention which can be explained by psychosocial variables.

To date, many studies about contraceptive intention have focused on identifying the correlations among social influences, attitude, self-efficacy and contraceptive intention rather than hypothesizing a comprehensive model among these variables. Investigating how social influences, attitude and self-efficacy operate together to influence contraceptive intention and its gender comparison among sexually inexperienced adolescents would help nurses to develop effective and gender-specific intervention programmes. The purposes of this study were twofold: (i) to test latent constructs of social influences, contraceptive attitude and self-efficacy for contraception as a causal model of contraceptive intention and (ii) to test gender differences in the causal model of contraceptive intention among the sexually inexperienced adolescents. In this study, we modified the TRA and incorporated the concept of self-efficacy. We hypothesized a model outlining the causal directions among constructs of social influences, contraceptive attitude, self-efficacy for contraception and contraceptive intention (Fig. 1). We hypothesized not only that social influences affected contraceptive intention directly, but also that they affected contraceptive intention indirectly through the effects of contraceptive attitude and self-efficacy for contraception. Contraceptive attitude and self-efficacy for contraception affected contraceptive intention directly. Additionally, contraceptive attitude affected contraceptive intention indirectly through the mediation of self-efficacy for contraception.

## Methods

### Participants

This was a cross-sectional study and part of a study that assessed the factors related to adolescent pregnancy. Two vocational high schools were selected by convenience sampling from Kaohsiung City, Taiwan. Five classes were randomly selected from the 10–12th grades in each school and students of each class were invited to complete questionnaires. There are no national regulations regarding informed consent specifically for adolescent health research projects in Taiwan. However, we ensured the privacy and confidentiality of students. To protect the students from recognition and increase the chances of an honest disclosure of information when distributing the questionnaire, the questionnaire was anonymous and included a blank cover page to secure confidentiality. All students were informed that there was no penalty for refusal to participate and that they had a right to withdraw at any time. Completion and return of the questionnaire was considered as an indication of informed consent.

Students were asked to answer one question 'Have you ever had sex?' Students who reported that they had not had

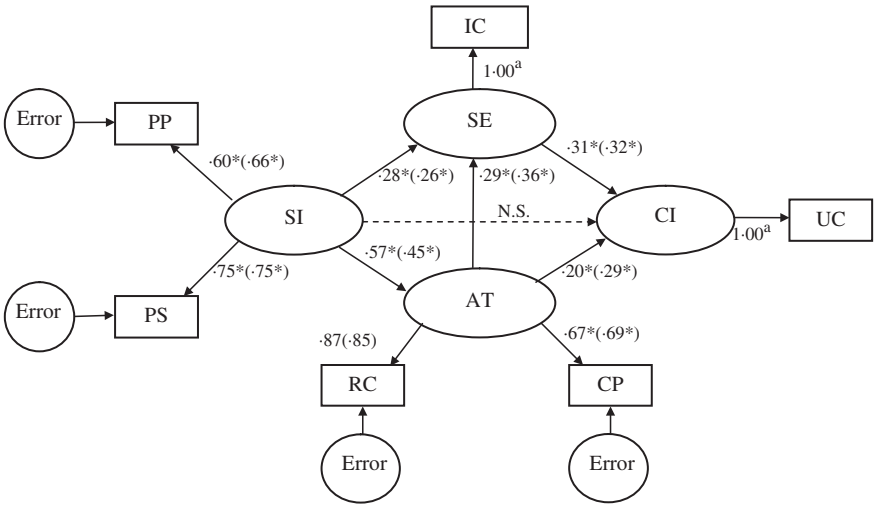


**Figure 1** Structural model and standardized path coefficients ($\beta$) for the girls' and boys' models (boys' coefficients in parentheses); ⬭: latent variable; □: observed variable; ○: measurement error in observed variable; → : unidirectional path. SI, social influences; PP, perceptions of peers' contraceptive behaviour; PS, perceptions of support from significant others for contraception; SE, self-efficacy for contraception; IC, insistence on contraception; AT, contraceptive attitude; RC, attitude towards necessity of contraception; CP, attitude towards contraceptive practice; CI, contraceptive intention; UC, possibilities of using contraceptives; N.S., not significant; $*p < 0{\cdot}05$; a: set as 1 because construct is directly measured by an observed variable.

sex were asked to answer questions relevant to contraceptive intention. The others were asked to answer questions relevant to contraceptive practice. Among 1161 boys and 964 girls who were invited, 1000 boys and 920 girls completed the questionnaire, with a response rate of 86·2% and 95·4% respectively. Among these respondent students, 770 boys and 685 girls who reported never having had sex were selected as our study participants. All surveys were administered in the classroom by one of the researchers.

## Instruments

In this study, we used an anonymous questionnaire to collect data. Age was measured for each participant. Constructs of interest in the study including social influences, contraceptive attitude, self-efficacy for contraception and contraceptive intention were measured by multiple items to reduce the measurement errors (Bollen 1989).

*Construct of social influences*

Construct of social influence was measured by two observed variables: perception of support from significant others for contraception and perception of peer's contraceptive behaviour.

*Scale for perceptions of support from significant others for contraception* Eight items developed by the authors were used to assess the participants' perception of parents, teachers and school nurses in supporting their practice of contraception. The example item was 'My parents are concerned about my contraceptive use if I decide to have sex'. Responses were rated on a scale with the terms 'strongly disagree' (1 point) to 'strongly agree' (4 points). Possible scores ranged from 8–32. A higher score indicated that participants perceived more support for their practice of contraception from significant others. In this study, Cronbach's $\alpha$ was 0·88 for girls and 0·89 for boys.

*Scale for perceptions of peers' contraceptive behaviour* Seven items developed by the authors were used to assess the participant's perception of their peers' involvement with contraception. The example item was 'My friends can use contraceptives correctly'. Responses were rated on a scale with the terms 'strongly disagree' (1 point) to 'strongly agree' (4 points). Possible scores ranged from 7–28. A higher score indicated that the participants perceived their peers had more involvement with contraception. In this study, Cronbach's $\alpha$ was 0·86 for girls and 0·86 for boys.

*Construct of contraceptive attitude*

Construct of contraceptive attitude was measured by two observed variables: attitude towards necessity of contraception and attitude towards contraceptive practice.

*Scale for attitude towards necessity of contraception* Ten items were used to assess participants' beliefs about the

 

necessity of practicing contraception when having sex. The example item was 'I think adolescents should use contraceptives when they have sex'. Each item represented a belief statement and it was rated on a four point scale from 'strongly disagree' (1 point) to 'strongly agree' (4 points) for positively worded items. Negatively worded items were reverse-coded. Possible scores ranged from 10–40. A higher score indicated that the participants had more positive attitudes towards the necessity of contraception. In this study, Cronbach's α was 0·69 for girls and 0·71 for boys.

*Scale for attitude towards contraceptive practice* Nine items were used to assess participants' positive or negative evaluation about contraception. The example item was 'Using contraceptives is a troublesome thing'. Each item represented a belief statement and it was rated on a four point scale from 'strongly disagree' (1 point) to 'strongly agree' (4 points) for positively worded items. Negatively worded items were coded reversely. Possible scores ranged from 9–36. A higher score indicated a more positive attitude towards contraceptive practice. In this study, Cronbach's α was 0·70 for girls and 0·77 for boys.

*Construct of self-efficacy for contraception*
Construct of self-efficacy for contraception was measured by one observed variable: insistence on contraception.

*Scale for insistence on contraception* Six items were used to assess the participants' degree of certainty for using contraceptives over contraceptive situations. Responses were rated on a scale as follows: 0, 'no confidence'; 1, 'about 20–30% confidence'; 2, 'about 50% confidence'; 3, 'about 70–80% confidence' and 4, 'absolute confidence'. The possible scores ranged from 6–24, with a higher score indicating higher self-efficacy for contraception. In this study, Cronbach's α was 0·88 for girls and 0·86 for boys.

*Construct of contraceptive intention*
The item, 'If you want to have sex within the next year, how strong is the possibility of your using contraceptives?' was used as an observed variable to measure contraceptive intention. The possibility of contraceptive use was scored by 0 (will absolutely not use them)–10 (will absolutely use them), with a higher score indicating higher contraceptive intention.

*Validity and reliability*
Related experts, including researchers and practitioners of public health, nursing, sexual health education, obstetrics and school nursing evaluated all instrument items for their content relevance and appropriateness. Based on the experts' suggestions and comments, some items were reworded to increase their succinctness. Ten adolescents were requested to examine items of the revised instrument for understanding and clarity. Unclear and ambiguous wording was modified based on the responses of these adolescents. The Cronbach's α for each scale was calculated.

## Data analysis

Structural equation modeling (SEM) is especially appropriate to test whether the data fit the hypothesized theoretical model (Tanaka *et al.* 1990). A structural equation model is composed of measurement and structural parts. The measurement part formulates the relationship between observed variables and latent constructs (i.e. factor loading), whereas the structural part formulates the interrelationships between constructs, especially the paths from predictor constructs to criterion constructs (Bollen 1989, Kline 1998). Predictor constructs emanate paths to other constructs while criterion constructs are influenced by other constructs in the model. For example, in Fig. 1, social influences and contraceptive intention are predictors and criterion constructs respectively. In SEM, constructs that are hypothesized as causes of other constructs can also be affected by other constructs. For example, in Fig. 1, contraceptive attitude and self-efficacy for contraception are predictors of contraceptive intention and they are affected by social influences. SEM features in estimating parameters of the whole model simultaneously and providing the overall fit of the model. These features are especially useful in testing a complex hypothetical model.

In this study, parameters were estimated using the maximum likelihood method with EQS 6.1 (Bentler 2004). For maximum likelihood method in SEM, the observed variables are assumed to follow multivariate normal distribution. The assumption may not be met if the analysis is based on the item level. In this study, item scores are summed to create scale scores as observed variables and the scores can more reasonably be assumed to be normally distributed (Bandalos 2002, Little *et al.* 2002).

In addition to parameter estimates, another feature of SEM is that the fit of the hypothetical model can be assessed (Bollen 1989). Because the model includes two parts, data-model fit reflects appropriateness of not only the structural part but also the measurement part. To overcome the problem, the study follows a two-step approach recommended by Jöreskog and Sorbom (1996). The first procedure of the two-step approach is to test the adequacy of the measurement part using a confirmatory factor analysis, i.e. to determine whether the observed variables were empirically

related to the constructs. After the measurement part of model is validated, the whole hypothetical model is then tested.

In SEM, data-model fit can be evaluated by chi-square statistics and goodness-of-fit indices (Tanaka 1993, Jöreskog & Sorbom 1996). The omnibus chi-square statistics were proposed as the first index to test whether the model was consistent with the data, but it was found to be sensitive to sample sizes (Jöreskog & Sorbom 1996). After 1980, over 20 other fit indices were suggested to assess different prospects of model fit. Tanaka (1993) classified the goodness-of-fit index and suggested evaluating the adequacy of the theoretical model using multiple indices as well as chi-square statistics (Tanaka 1993). Therefore, this study evaluated the model based on the chi-square statistics and the following multiple fit indices. The fit indices included: (i) the standardized root mean square residual (SRMR): the values of 0·08 or less are desired are considered acceptable fit (Hu & Bentler 1999); (ii) the root mean square error of approximation (RMSEA): a value of 0·08 or less is considered acceptable fit; and the 90% confidence interval (CI) of RMSEA containing 0·06 or zero indicates the possibility of close fit (Bentler 2004); (iii) Normed fit index (NFI): values of 0·90 are considered acceptable fit (Bentler 2004) and (iv) Comparative fit index (CFI): values above 0·90 indicate acceptable fit (Bentler 2004). The first two indices reflect only the degree of model-data fit and are termed as absolute fit index. The last two evaluate the fitness of model contrasted to another independent baseline model, so they are the relative fit index (Tanaka 1993). Both the CFI and RMSEA are sensitive to model misspecification and are minimally affected by sample size (Hu & Bentler 1995).

Another advantage of using SEM includes the ease of testing for significant differences of parameters of the same model across groups. Once a structural model is determined to be acceptable for two comparison groups, additional tests (i.e. chi-square difference tests) may be performed to identify possible differences between the groups. According to the suggestions of Bollen (1989), we first constrained the form and factor loadings to test the equivalence of measurement model across gender. Secondly, we constrained the structural paths, error variances and residual variances to test the equivalence of the structural model. Statistically significant differences in chi-square value would suggest that there were differences across gender groups.

## Findings

The age range of participants was from 15·4–19·2 years old. The mean (SD) age of girls ($n = 685$) and boys ($n = 770$) was 17·93 (0·74) and 17·94 (0·78) respectively. Table 1 presents the means and the SD for all the observed variables separately for boys and girls. Compared with boys, girls reported significantly higher scores in all observed variables.

Table 2 shows the covariance matrix among all the observed variables in girls and in boys. By testing the measurement model, all the observed variables were significantly loaded on their corresponding latent construct (Fig. 1). The fit indices of girls' model were: $\chi^2$ (5, $n = 685$) = 24·49, $p < 0·05$; NFI = 0·97; CFI = 0·98; SRMR = 0·022 and RMSEA = 0·08 (90% CI: 0·05–0·11). The fit indices of the boys' model were: $\chi^2$ (5, $n = 770$) = 23·54, $p < 0·05$; NFI = 0·98; CFI = 0·98; SRMR = 0·03 and RMSEA = 0·069 (90% CI = 0·04–0·10). Although the chi-square values in both genders were statistically significant, the other fit indices satisfied the cut-off criteria. The measurement model demonstrated a good fit, indicating that the observed variables used to measure their corresponding latent constructs in both genders were adequate.

A structural model was tested for both girls and boys. Common to both genders, the standardized path coefficients ($\beta$) were all statistically significant ($p < 0·05$) except for the path from social influences to contraceptive intention (girls' model: $\beta = 0·036$, $p > 0·05$; boys' model: $\beta = 0·094$, $p > 0·05$). To make the model more parsimonious, the insignificant path from social influences to contraceptive intention was deleted. The standardized path coefficients for each gender are depicted in Fig. 1. The standardized path coefficients were all statistically significant. The fit indices of the girls' model were: $\chi^2(6, n = 685) = 24·84$, $p < 0·05$; NFI = 0·97; CFI = 0·98; SRMR = 0·02 and RMSEA = 0·07 (90% CI = 0·04–0·10). The fit indices of the boys' model were: $\chi^2(6, n = 770) = 27·33$, $p < 0·05$; NFI = 0·98; CFI = 0·98; SRMR = 0·03 and RMSEA = 0·07 (90%

**Table 1** The gender comparison of observed variables

| Variable | Girls mean ± SD | Boys mean ± SD | *t* |
|---|---|---|---|
| UC | 8·06 ± 2·71 | 7·43 ± 2·41 | 4·72** |
| IC | 19·45 ± 4·93 | 16·77 ± 5·43 | 9·84** |
| RC | 33·38 ± 3·83 | 31·25 ± 3·99 | 10·36** |
| CP | 28·53 ± 3·89 | 26·17 ± 4·17 | 11·14** |
| PP | 19·97 ± 3·97 | 19·35 ± 3·99 | 2·96** |
| PS | 24·51 ± 4·52 | 23·29 ± 4·32 | 5·23** |

UC, possibilities of using contraceptives; IC, insistence on contraception; RC, attitude towards necessity of contraception; CP, attitude towards contraceptive practice; PP, perceptions of peers' contraceptive behaviour; PS, perceptions of support from significant others for contraception.

**$p < 0·01$

 

**Table 2** Covariance matrix of observed variables among girls and boys(boys in parentheses)

| Variable | UC | IC | RC | CP | PP | PS |
|---|---|---|---|---|---|---|
| UC | 7·349 (5·800) | | | | | |
| IC | 5·321 (5·937) | 24·326 (29·487) | | | | |
| RC | 2·900 (3·385) | 7·479 (8·828) | 14·707 (15·938) | | | |
| CP | 2·744 (3·434) | 5·474 (7·525) | 8·691 (9·812) | 15·118 (17·423) | | |
| PP | 2·082 (2·338) | 5·923 (6·499) | 3·794 (3·809) | 4·127 (2·213) | 15·735 (15·906) | |
| PS | 2·305 (2·347) | 7·044 (7·061) | 6·942 (5·685) | 4·529 (3·250) | 8·081 (8·435) | 20·440 (18·665) |

UC, possibilities of using contraceptives; IC, insistence on contraception; RC, attitude towards necessity of contraception; CP, attitude towards contraceptive practice; PP, perceptions of peers' contraceptive behaviour; PS, perceptions of support from significant others for contraception.

CI = 0·04–0·10). The fit indices for each gender satisfied the cut-off criteria, indicating that structural models for each gender demonstrated a good fit. Although social influences do not influence contraceptive intention directly, indirect effects of social influences on contraceptive intention are significant (girls' model: $\beta = 0{\cdot}25$, $p < 0{\cdot}05$; boys' model: $\beta = 0{\cdot}26$, $p < 0{\cdot}05$), indicating that the impact of social influences on contraceptive intention was completely mediated by contraceptive attitude and self-efficacy for contraception. Additionally, for both genders, contraceptive attitude had a significantly indirect effect on contraceptive intention (girls' model: $\beta = 0{\cdot}09$; $p < 0{\cdot}05$; boys' model: $\beta = 0{\cdot}11$, $p < 0{\cdot}05$). This indicated that contraceptive attitude impacted contraceptive intention mediated by self-efficacy for contraception. Total effect, which is the sum of direct and indirect effects, is also calculated as the net influence from predictor construct to criterion construct. The total effects ($\beta$) of social influences, contraceptive attitude and self-efficacy for contraception on contraceptive intention were 0·25, 0·29 and 0·31, respectively, in girls; 0·26, 0·40 and 0·32, respectively, in boys. Because social influences had no direct effect on contraceptive intention, the total effect of social influences on contraceptive intention is the same as the indirect effect of social influences on contraceptive intention. On the other hand, because there is only a direct effect from self-efficacy to contraceptive intention, the total effect of self-efficacy on contraception intention is the same as the standardized path coefficient shown in Fig. 1. However, the total effect of contraceptive attitude on contraceptive intention is made up a combination of direct effect of contraceptive attitude on contraceptive intention and the indirect effect of contraceptive attitude on contraceptive intention mediated by self-efficacy for contraception. Both total and indirect effects estimated in the boys' model are larger than those in girl's model. Total effect of contraceptive attitude on contraceptive intention is the greatest among all total effects.

A multiple-group analysis with chi-square difference test was used to test, if there were differences in measurement model and causal path across gender groups. The comparison of the forms and loadings across gender are shown in Table 3. The results show that there was no significant difference in $\chi^2$value ($\chi^2_{\text{difference}(3)} = 1{\cdot}22$, $p > 0{\cdot}05$), indicating that the loadings were equivalent between the boys' and girls' models. The measurement model was equivalent across gender groups. As shown in Table 3, there was no significant difference in the $\chi^2$ value when constraining the structure ($\chi^2_{\text{difference}(5)} = 4{\cdot}56$, $p > 0{\cdot}05$) and error variances ($\chi^2_{\text{difference}(4)} = 5{\cdot}01$, $p > 0{\cdot}05$). The structural paths and error variances were equal across gender groups. This indicated that the structural model was equivalent between boys and girls. However, the residual variances of contraceptive attitude ($\chi^2_{\text{difference}(1)} = 5{\cdot}38$, $p = 0{\cdot}022$), self -efficacy for contraception ($\chi^2_{\text{difference}(1)} = 5{\cdot}10$, $p = 0{\cdot}024$) and contraceptive intention ($\chi^2_{\text{difference}(1)} = 19{\cdot}34$, $p = 0{\cdot}001$) all significantly differ across the gender groups. This indicated that the variances of each criterion construct explained by predictor constructs were different across the gender groups. Although our hypothetical model is consistent with the data, it does not mean that the model explained all possible variations of criterion constructs. $R^2$ indicates the explained variances of criterion constructs in the hypothetical model. By calculating $R^2$, it is found that the construct of social influences accounting for variances of contraceptive attitude in girls ($R^2 = 0{\cdot}33$) was larger than that in boys ($R^2 = 0{\cdot}20$). However, the construct of social influences and contraceptive attitude accounting for variances of self-efficacy for contraception in girls ($R^2 = 0{\cdot}26$) was less than that in boys ($R^2 = 0{\cdot}28$). The construct of social influences, contraceptive attitude and self-efficacy for contraception accounting for variances of contraceptive intention in girls ($R^2 = 0{\cdot}19$) was less than that in boys ($R^2 = 0{\cdot}27$).

## Discussion

In this study, girls had better contraceptive intention, contraceptive attitude and self-efficacy for contraception

**Table 3** Testing the model equality across gender groups

| Constrained | $\chi^2$, df | Difference of $\chi^2$, df |
|---|---|---|
| Form | 52·16, 12 | – |
| Loading | 53·38, 15 | 1·22, 3 |
| Structure | 57·94, 20 | 4·56, 5 |
| Error variances | 62·95, 24 | 5·01, 4 |
| Residual variances for contraceptive attitude | 68·33, 25 | 5·38*, 1 |
| Residual variances for self-efficacy for contraception | 73·43, 26 | 5·10*, 1 |
| Residual variances for contraceptive intention | 92·77, 27 | 19·34*, 1 |

*$p < 0{\cdot}05$.

than boys, which is similar to previous studies (Murphy *et al.* 1998, Baele *et al.* 2001). Because girls typically shoulder most of the burden that an unexpected pregnancy produces, it is not surprising that girls scored more highly in contraceptive intention, contraceptive attitude and self-efficacy for contraception than boys. Most Taiwanese people also support the notion that contraception is the girl's responsibility and pay more attention to girls concerning their contraception, which results in girls perceiving higher social influences than boys do. Contraceptive education needs to focus on increasing boys' awareness of their personal responsibility in contraceptive practice. Contraceptive attitude affected contraceptive intention not only directly but also indirectly through the effect of self-efficacy for contraception in this study. Programmes should be designed to improve contraceptive attitudes among sexually inexperienced adolescents. Additionally, within the context of the model, self-efficacy for contraception functioned as a central mediator through which social influences and contraceptive attitude exerted their influences on contraceptive intention. The results suggest that improving the self-efficacy for contraception should be emphasized to sexually inexperienced adolescents.

In this study, we found that social influences affected contraceptive intention through the effect of contraceptive attitude and self-efficacy for contraception. That differs from the statement of TRA (Ajzen & Fishbein 1980), which proposed that social influences directly correlated with behavioural intention. These findings extend the understanding the role of social influences in predicting behavioural intention.

Additionally, both contraceptive attitude and self-efficacy for contraception had greater total effects on contraceptive intention than social influences did on both genders. Interventions that only seek to change social influences may be ineffective in eliciting change of contraceptive intention. Intervention targeting on contraceptive attitude and self-efficacy for contraception is more likely to improve contraceptive intention among sexually inexperienced adolescents. The total effects of contraceptive attitude on contraceptive intention were higher than self-efficacy for contraception in boys. However, in girls, total effects of self-efficacy for contraception on contraceptive intention were higher than contraceptive attitude. Contraceptive intention intervention should be more focused on improving the attitude of boys; however, it should also be more specifically focused on improving self-efficacy for girls.

Because social influences had a direct effect on contraceptive attitude and self-efficacy for contraception, developing social influences regarding contraception should be considered as an important strategy to improve contraceptive attitude and self-efficacy for contraception among sexually inexperienced adolescents. Parents, teachers and school nurses should communicate actively with sexually inexperienced adolescents about the issues of contraception. Peer-led programmes are useful to create norms for adolescents and they have been proven to be a useful strategy in improving the intention of condom use among adolescents (Agha & Rossem 2004, Caron *et al.* 2004). Peer-led programmes could be a useful approach to create descriptive norms for contraception among sexually inexperienced adolescents.

Social influences, contraceptive attitude and self-efficacy for contraception explained more variances of contraceptive intention for boys than for girls. A previous study has also shown that social influences, attitudes and self-efficacy predicted more variations in condom use intention for males than for female adolescents (Taffa *et al.* 2002). Gender is a moderator that can modify the variances of contraceptive intention explained by social influences, contraceptive attitude and self-efficacy for contraception. It seems worthwhile to put more efforts into investigating gender-specific factors relating to contraceptive intention among sexually inexperienced adolescents. In this study, the paths among social influences, contraceptive attitude and self-efficacy for contraception to influence contraceptive intention were supported because of satisfactory fit indices. However, the explained variances were low, which indicated that we should explore more causal constructs influencing contraceptive intention such as perceptions of susceptibility and severity of pregnancy in the model in future.

When interpreting the results presented here, we have to take into account factors that might have influenced our findings. Firstly, the sample of the study was selected by

 

convenience sampling, which limits the generality of results. Secondly, the original theoretically proposed model was modified and it needed to be cross-validated. It is usual practice to divide the whole sample randomly into two samples; the model should be modified in the first sample and cross-validated in the second sample (Bollen 1989). Although it is a good strategy, the sample size of each gender group of the study does not allow for division into two groups to cross-validate the model. According to the suggestion of Muthén and Muthén (2002), sample size in the study should be 520 for each gender on $\alpha = 0.05$, power = 0.80. As our sample sizes in both genders were just more than required and less than double 520, randomly splitting the data would have lowered the power below the desired level. Combining the above limitations, we need to apply the modified causal model to another sample to test its validity and also experimental or longitudinal design is needed to examine the validity of this causal model. Good fit does not mean that the model is proved; it simply means that, given our data, we do not reject the model (Loehlin 1987). We need to elaborate our model to more understand the causal effect of contraceptive intention among sexually inexperienced adolescents.

## Conclusions

The present study supports the effect of social influences on behavioural intention through the effect of personal factors. Personal factors and social influences operate interdependently and should not be exclusive of one another when nurses design contraceptive intention programmes for sexually inexperienced adolescents. The data reported here support that among adolescents there are gender differences in social influences, contraceptive attitude, self-efficacy for contraception and contraceptive intention. Additionally, gender is a moderator that can modify the influential level of social influences, contraceptive attitude and self-efficacy for contraception on contraceptive intention. Nurses in health clinics, schools and communities should provide gender-specific intervention programmes for adolescents. This study represents initial efforts to address the needs of Taiwanese youth, a group that has not been extensively targeted in contraceptive efforts. The results of this study could be used as a reference for related research and policy development in Taiwan and other countries.

## Contributions

Study design: R-HW; data collection and analysis: R-H W, C-PC; manuscript preparation: R-HW, F-HC.

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