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Social Cognitive Theory Constructs That Predict Betel Nut Chewing Among Secondary Students

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Abstract

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by

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Dissertation Submitted in Partial Fulfillment

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Abstract

After alcohol, tobacco, and caffeine, areca or betel nut is the 4th most common substance of abuse in the world, and its prevalence of use in the Solomon Islands is estimated at 68% in young people. Long-term use of betel nut can result in detrimental health outcomes such as oral cancers and metabolic syndrome. Guided by the social cognitive theory (SCT), the purpose of this quantitative cross-sectional study was to determine whether the constructs of SCT predict betel nut use in Year 12 secondary students in the Solomon Islands. Five SCT constructs of expectations (outcome expectations and outcome expectancies), self-efficacy, self-efficacy to overcome barriers, self-control, and environment were used to build a model for the study. Data were collected from a convenience quota sample of 138 Year 12 secondary students through a 37-item questionnaire. Results from multiple linear regression and multiple logistic regression analysis indicated that only self-efficacy to overcome barriers ($p < .01$) was significantly related to intent to not chew betel nut. SCT was weakly predictive with low explained variance for not chewing betel nut in secondary students. Findings contribute to social change by being useful for school health program developers and researchers working on strategies to improve intervention actions to reduce betel nut use.

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Dedication

This dissertation is dedicated to my daughter, Loraini Solea; my grandson, Ezekiel Azariah; and my extended family. May they all be inspired and believe that education continues throughout life.

Acknowledgments

My sincere appreciation is directed to my committee chair, Dr. Manoj Sharma, who continued to inspire me and contributed time and effort to help me reach the end of my study. I would also like to thank both my committee member, Dr. Hadi Danawi, for his invaluable critiques and inputs to my dissertation, and my university research reviewer, Dr. Mehdi Agha, for the supportive advice and facilitation of the dissertation processes. The contributions of the Solomon Island Ministry of Health staff, especially Mr. Ambrose Roots Gali of the Health Promotion Department, are appreciated and acknowledged. Last but not least, I would like to sincerely thank the Ministry of Education, school management authorities, and school students of the three secondary schools in the Honiara school district for their assistance, facilitation, contribution, and participation in this research.

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Chapter 1: Introduction to the Study

Betel nut chewing is a major health and social problem in the adolescent and adult age groups in the Solomon Islands. Sullivan and Hagen (2002) reported that after tobacco, alcohol, and caffeine, betel or areca nut is the fourth most commonly used substance of abuse in the world. In the Solomon Islands, the prevalence of betel quid chewers in the adult population was estimated at 76.8% (Tovosia et al., 2007). In young people 15-24 years of age, Quinn et al. (2017) reported a prevalence of current betel nut users at 88%. This high prevalence rate is similar to that recorded (63.4%) in secondary students in the Pacific Island of Saipan in Micronesia (Oakley, Demaine, & Warnakulasuriya, 2005). At least one adverse complication of long-term betel nut chewing is oral submucous fibrosis, a premalignant condition for cancer of the oral cavity (Franke, Lai, Kawamoto, Pokhrel, & Herzog, 2014). Studies of betel nut use focusing on behavior have been minimal. In addition, the use of theory in behavioral research has become important in health education and health promotion program planning (Glanz & Bishop, 2010). In this study, I examined whether the social cognitive theory (SCT) constructs predict betel nut use in secondary students in the Solomon Islands. The quantitative study was school based and included a questionnaire based on the SCT. The study addressed both chewers and nonchewers because I wanted to build a model for predictors of nonchewing behavior. The findings may provide educators with additional knowledge on means to improve health education and health promotion. In this chapter, I introduce the study and explain its importance in relation to positive social change. I also

present the research questions and hypotheses, theoretical framework, assumptions, limitations, and significance of the study.

Background

Betel nut has been widely used for various purposes by indigenous communities in many regions of the world. Chen and Waigandt (2009) reported that betel nut chewing is popular and widespread in tropical and subtropical areas, including Africa, India, Pakistan, Nepal, South East Asia, Southern China, Taiwan, and the Pacific islands especially New Guinea, Solomon, and Guam. The extension of betel nut use to other regions of the world has been linked to the immigration of indigenous communities from countries of high prevalence of use (Beecher et al., 1985). Although the areca palm and betel vine grow well in the Pacific Islands region, the World Health Organization (WHO, 2012) stated that the Solomon Islands and the northern islands of Vanuatu are the southernmost extension of betel nut chewing habit.

Numerous studies on betel nut prevalence of use in the general population and selected subpopulations have been undertaken in countries of use, particularly Asia and the Pacific Islands. In the Asian region, Chu, Wu, Shen, and Lin (2006) reported that 19.8% of new military recruits in Taiwan chew betel nut. Shah, Merchant, Luby, and Chotani (2002) in a survey of Pakistani children ages 4-16 stated that 35% of the children identified themselves as daily users. For the adolescent age group and young people in the Pacific region, several observations have been reported. Milgrom, Ohnmar, Gilmatam, Gallen, and Chi (2013) found that 15% of school children in Yap and Pohnpei in Micronesia reported the daily use of betel nut. In the island of Palau in Micronesia, the

Palau Youth Tobacco Surveys 2009 indicated that 62.9% of middle school students and 74.8% of high school students have tried betel nut (WHO, 2012). For the Solomon Islands in Melanesia, 34% of men and 20.9% of women in the age group 15-24 years were daily betel nut chewers as reported in the noncommunicable disease risk factor survey report (Solomon Islands NCDRF, 2010). These percentages on prevalence of betel nut use have confirmed the ongoing popularity of the substance in these communities and populations.

Researchers have made several observations in relation to betel nut uptake and ongoing use. Ghani et al. (2011) identified that gender, age, ethnic group, and smoking history were factors that influenced the development and cessation of betel chewing behavior. In addition, the age of initiation to betel nut use has been an important factor for consideration in relation to cessation strategies and for assessing long-term complications of use. In the Solomon Islands, Tovosia et al. (2007) reported that in the young generation, men started betel quid chewing early at 13.2 years and women at 14.7 years. However, Tovosia et al. concluded that in the older generation, betel quid chewing started much later at 18.8 years for men and 18.2 years for women. Investigating the age of betel nut use initiation in Taiwan, Guo et al. (2013) reported that betel nut initiation occurred as early as 13 years. Guo et al. also stated that many of the betel nut users progressed to consume alcohol and smoke cigarettes at around the same age.

Moreover, there are sociocultural linkages to betel nut use in all regions where the nut has been used. Croucher and Islam (2002) reported that in indigenous communities in South East Asia, East Africa, and the Western Pacific, betel nut use behavior and practice

are important expressions of social and cultural identity. In the island of Guam and Micronesia, Pobutsky and Neri (2012) reported that betel nut use is part of socializing, and mature nuts are offered to guests. In some cultures, betel nut sharing is a demonstration of courtesy when greeting or bidding farewell to a visitor as a means of facilitating relaxed behavior. Strickland (2002) stated that betel nut use, regardless of the relative social standing, resembled a form of token commensality. Betel leaves are also important because of their medicinal, religious, and ceremonial value in Southeast Asia. Rai et al. (2011) stated that in India, it is customary to serve betel leaves to guests for social, cultural, or religious reasons.

There are socioeconomic factors linked to betel nut production and use that may impact control efforts. Many communities have benefitted from the cultivation, marketing, and sales of betel nut and its products. Croucher and Islam (2002) reported that because of high market demands in India, the cultivation practices for the areca palm have changed to necessitate the recruitment of a permanent labor force to tend to the trees. However, Croucher and Islam proposed that to affect individual consumption, there should be changes in social and economic policies that could negatively impact cultivation and marketing practices. Because betel nut is often used in combination with other substances such as alcohol and tobacco, the marketing of these other substances could also impact betel nut uptake and use (Wen at al., 2005).

The association between betel nut use and tobacco or alcohol use is well recorded in the literature. Wen et al. (2005) reported that nearly 93% of Taiwan's betel nut users were also smokers, and users either began smoking first or took up both habits

simultaneously. The WHO (2012) stated that the aggressive marketing of tobacco products had resulted in increased use and also use in combination with betel nut. Tobacco use with betel nut use occurs when tobacco is added to the betel quid or smoking occurs with betel nut chewing (WHO, 2012). In a study of health-promoting behaviors in Taiwan, Guo et al. (2013) found that betel nut chewers were more likely to smoke cigarettes and consume alcohol and have poor health-promoting behaviors including poor oral hygiene.

The adverse effects of betel nut use are well documented in the literature. The International Agency for Research on Cancers has classified areca nut as a carcinogen under Group 1 in its cancer risks classification (IARC, 2004). Of the medical complications associated with chronic betel nut use, oral submucous fibrosis is the most prominent and common to all regions of betel nut prevalence (Aziz, 2010). In addition, Aziz reported that oral submucous fibrosis as an insidious precancerous condition linked to betel nut chewing.

Control of betel nut use is legally unregulated in most countries of high prevalence of use. In the Pacific Island countries, reported policies and laws were developed mostly in relation to the spitting of betel nut quid in public places, especially in health care facilities and schools (WHO, 2012). The WHO (2012) also reported that for the Marshall Islands, the law in 2010 to ban the importation, distribution, and sale of betel nut in the country was related to the unsightly spitting habit and the expectorated by-products of betel nut quid. Controlling betel nut use through taxation has been another strategy explored by countries. Chen et al. (2010) reported the existence of cross-price

elasticity of betel nut and cigarette consumption in Taiwan, where a proposed betel nut health tax could reduce cigarette consumption. Chen et al. further stated that the betel nut tax, once enacted, could provide an additional platform for harm-reduction strategies in relation to cigarette consumption. Legalized control measures and enhanced health-promotion strategies against betel nut use are important components in national efforts to reduce betel nut use in the general population, especially in young people.

Tareg, Modeste, Lee and Santos (2015) used the health belief model in Yap, Micronesia to explore perceptions of tobacco use and chewing betel nut. Dai and Sharma (2014) used the SCT to predict prevention behaviors on childhood obesity for elementary students in Taiwan. Dai and Sharma asserted that the SCT concepts can provide a useful basis for preventive health programs specific to the group. Apart from health education and health promotion, reducing and limiting betel nut use can also occur through policies and regulation.

Problem Statement

For decades, betel nut use has been viewed as a significant public health problem. In addition, betel nut use in combination with tobacco products and alcohol has complicated efforts to control consumption in the affected populations (Wen et al., 2005). Chewing of betel nut in young people has become an increasing health and social concern as early initiation and long-term use are important factors in relation to medical complications (Frankie et al., 2014). Betel nut use beginning in the adolescent period and continuing to adulthood is similar to substance use disorder that can have significant health risks in later life (Shah et al., 2002). Palmer et al. (2009) observed that substance

use and substance use disorder increased from adolescence to young adulthood. In addition, Palmer et al. stated that there was a generalized risk or correlated risk factors toward the early onset of substance use and the subsequent development of substance use disorders.

As evident in the literature, persistent high prevalence of betel nut use in the Asia and Pacific regions poses as a major challenge to substance control efforts of health, education, and related authorities. Documenting ongoing high prevalence of use, Oakley et al. (2005) reported that in Saipan in the Federated States of Micronesia, 63.4% of adolescents chew betel nut and most identified as regular users. Less than a decade later, Milgrom et al. (2013) in a similar prevalence study observed that adolescents in the Northern Pacific Islands of Yap and Pohnpei States in the Federated States of Micronesia started chewing betel nut at an early age, and around 65% of those surveyed were regular users. Early and regular betel nut use should of great concern to national authorities. Trivedy, Craig, and Warnakulasuriya (2002) reported that oral sub-mucous fibrosis, gum disease, and oral premalignant lesions are the most common health complications in long-term users. In addition, long-term betel nut use has been linked to metabolic syndrome, which is a group of conditions predisposing to the development of diabetes, obesity, and kidney diseases.

The current study was conducted in the South Pacific Island of Solomon where betel nut use is common in the general population including young adults. Tovosia et al. (2007) reported a betel nut use prevalence rate of 79% in the adult age group >29 years. In young people 15-24 years of age, the WHO noncommunicable disease STEPS survey

in 2006 revealed that 78% of males and 66% of females reported chewing betel nut at least once in the previous year (WHO, 2010). More recently, Quinn et al. (2017) reported in their survey of 400 young people in the same age group (15-24 years) that 88% (90% of males and 84% of females) chewed betel nut in the previous 4 weeks. The high betel nut chewing prevalence for more than a decade showed the popularity of the substance among young people and adults.

With limited studies available on betel nut use in adolescents in the Solomon Islands, the Ministry of Health has identified in its health promotion strategic plan the need to determine the extent of betel nut use in this age group and to understand the factors associated with its use. Evidence indicated that betel nut use prevalence had not decreased among adolescents over the past decade in the Solomon Islands or other Pacific Island countries (Milgrom et al. 2013; Quinn et al. 2017; Ome-Kaius et al. 2015). In countries of high prevalence of betel nut use, there have been few health education and health-promotion intervention studies conducted to address betel nut use in young people. Health education and health-promotion processes and actions need strengthening through effective strategies addressing substance use and abuse, including interventions incorporating behavioral theories. Bandura (2004) proposed behavioral intervention studies using three levels of stepwise implementation and the use of computer technology for enhanced interventions. Understanding and predicting betel nut use using theory, particularly the constructs of the SCT, is lacking in the literature. Information obtained from the current study may provide baseline information regarding current betel nut use by secondary students and may provide guidance to schools and health authorities

regarding health education and health-promotion interventions that can be used against betel nut chewing.

The gap in knowledge in betel nut substance use relates to interventions undertaken to limit use and the use of behavioral theory to support health education and health promotion strategies against betel nut chewing. Most studies that have been undertaken on betel nut use have focused on factors and issues related to its distribution and prevalence of use, behavioral influences related to substance uptake, social and ethnic factors, health complications of long-term use, and the economic impact of cultivation (Croucher, 2002). Behavioral theories have been used to predict behavior in health education and improve health-promotion intervention programs (Glanz & Bishop, 2010). Frameworks such as the health belief model, the trans-theoretical model, and the SCT are popular in health education and have been used to strengthen intervention strategies in health promotion. Glanz and Bishop stated that theories and models help not only to explain behavior but also to develop more effective ways to influence and change behavior. In my research, understanding the applicability of the selected SCT constructs in betel use behavior was intended to contribute to the formulation of effective health-promotion interventions targeting secondary students in the Solomon Islands.

Purpose of the Study

The purpose of this quantitative study was to examine whether the constructs of SCT (expectations, self-efficacy, self-efficacy to overcome barriers, self-control, and environment) predict and explain betel nut use in secondary students. I investigated the use of betel nut based on social influences experienced by adolescents and in relation to

the SCT constructs. The aim for conducting the study was to facilitate positive social change among adolescents in secondary schools and within communities by predicting betel nut use and influences as a basis for health-promotion interventions and for efforts to modify behaviors that affect decision-making and coping.

Dai and Sharma (2014) used the SCT constructs of self-efficacy, expectations, and self-control to examine whether they predict each of the four modifiable behaviors related to obesity development: daily physical activity, limiting screen viewing, drinking more water, and consuming adequate fruits and vegetables. The uses of SCT in substance abuse prevention have been limited to tobacco and alcohol behaviors. In tobacco control efforts, factors that have been identified to impact control and intervention efforts include the age of initiation, parental use, socioeconomic status, and history of tobacco use (Wen et al., (2005). Ghani et al. (2011) reported that gender, age, ethnicity, and smoking history were important factors influencing commencement of betel nut use while the type of quid chewed was an important factor for cessation. Dai and Sharma concluded that the SCT could be used to guide the formulation of preventive programs to the group.

The current study was needed to provide information lacking in the areas of betel nut use intervention. Wang, Tsai, Huang, and Hong (2007) discussed the effects of prevention intervention for betel nut chewing in school and concluded that health education can empower students to select better options than the use of betel nuts. The current study addressed the modifiable behavioral factors that can be targeted by the Ministry of Health for intervention efforts. I examined whether the independent variables of SCT constructs (expectation, self-efficacy, self-efficacy to overcome barriers, self-

control, and environment) predicted the dependent variable of not to chew betel nut in secondary students in the Solomon Islands. Covariates that are known to influence the dependent variable include gender, ethnicity, alcohol use, smoking, and parental substance use Lin et al., (2006). The effects of alcohol and smoking on betel nut use were also assessed in the study.

Research Questions and Hypotheses

The primary research question related to whether the five SCT constructs (expectations, self-efficacy to refuse betel nut, self-efficacy in overcoming barriers to refuse betel nut, self-control, and environment) would predict the option not to chew betel nut in secondary students. This study targeted both chewers and nonchewers so that a model for predictors of not-chewing behavior change could be formulated. To address the primary research question, the following questions and corresponding hypotheses were used:

RQ1: What is the predictive association between the social cognitive theory construct of expectations to not chew betel nut and betel nut use in secondary students?

H_o1: The social cognitive theory construct of expectations to not chew betel nut is not associated with betel nut use in secondary students.

H_a1: The social cognitive theory construct of expectations to not chew betel nut is associated with betel nut use in secondary students.

RQ2: What is the predictive association between the social cognitive theory construct of self-efficacy to refuse betel nut chewing and betel nut use in secondary students?

H_o2: The social cognitive theory construct of self-efficacy to refuse betel nut chewing is not associated with betel nut use in secondary students.

H_a2: The social cognitive theory construct of self-efficacy to refuse betel nut chewing is associated with betel nut use in secondary students.

RQ3: What is the predictive association between the social cognitive theory construct of self-efficacy in overcoming barriers to refuse betel nut chewing and betel nut use in secondary students?

H_o3: The social cognitive theory construct of self-efficacy in overcoming barriers to refuse betel nut chewing is not associated with betel nut use in secondary students.

H_a3: The social cognitive theory construct of self-efficacy in overcoming barriers to refuse betel nut chewing is associated with betel nut use in secondary students.

RQ4: What is the predictive association between the social cognitive theory construct of self-control to not chew betel nut and betel nut use in secondary students?

H_o4: The social cognitive theory construct of self-control to not to chew betel nut is not associated with betel nut use in secondary students.

H_a4: The social cognitive theory construct of self-control to not to chew betel nut is associated with betel nut use in secondary students.

RQ5: What is the predictive association between the social cognitive theory construct of environment and betel nut use in secondary students?

H_o5: The social cognitive theory construct of the environment to not to chew betel nut is not associated with betel nut use in secondary students.

H_a5: The social cognitive theory construct of environment to not to chew betel nut is associated with betel nut use in secondary students.

RQ6: What is the association between the SCT constructs and betel nut use among secondary students when controlling for alcohol use and smoking?

H_o6: There is no association between SCT constructs and betel nut use among secondary students when controlling for alcohol use and smoking.

H_a6: There is an association between SCT constructs and betel nut use among secondary students when controlling for alcohol use and smoking.

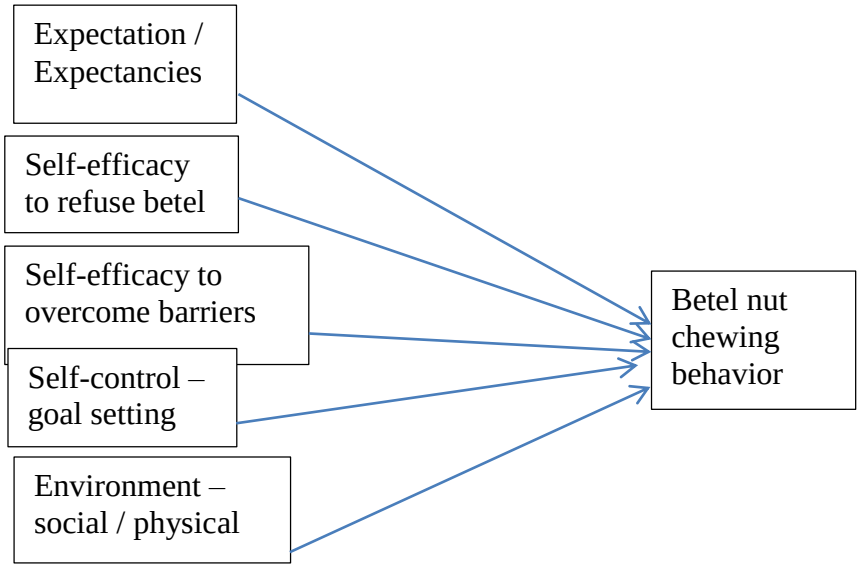

Figure 1. Social cognitive theory construct interaction with betel nut chewing behavior.

Theoretical Framework

The theoretical framework for this study was the SCT. SCT offered a theoretical lens from which to examine how secondary students learn and use betel nut. Bandura (2004) asserted that other health behavior theories, including self-efficacy theory, the theory of reasoned action, the theory of planned behavior, the health belief model,

protection motivation theory, and habit theory, are related frameworks but subsumed within SCT. Furthermore, Sharma (2017) explained that the SCT encouraged behavioral change through self-efficacy and goal setting. Sharma, citing alcohol and drug education intervention studies as example, stated that the application of SCT could be worthwhile. In the current study, the SCT constructs were examined as predictors of betel nut use behavior.

I did not identify studies that included the SCT constructs of expectations, self-efficacy in overcoming barriers, self-control, and environment to predict betel nut use. Because betel nut is mostly unregulated in countries, its use may be compared with nonmedical prescriptive drug use. Peralta and Steele (2010) in their study on nonmedical prescription drug use among college students determined that the SCT appeared to be relevant for identifying factors related to the use and nonuse of drugs. Dai and Sharma (2014) in their study on childhood obesity prevention behaviors stated that self-efficacy was the basis for behavioral change and a measure of confidence in a person's ability to accomplish a specific behavior. In addition, Dai and Sharma explained that the construct of expectation was related to behavioral outcomes and a person's value of those outcomes, while the construct of self-control was related to goal setting for accomplishing a given behavior. In relation to environment, the SCT emphasizes reciprocal determinism in relation to people's interactions with their environment and how the environment shapes behavior or is altered to suit devised purposes (McAlister, Perry, & Parcel, 2008).

In this study the SCT constructs of expectation, self-efficacy, self-efficacy to overcome barriers, self-control, and environment, factors was analyzed against the dependent variable of not chewing betel nut use in secondary students in the Solomon Islands. SCT is one of several theories used by researchers in behavioral research. Sharma (2017) reported that SCT could identify objectives and methods for behavioral change apart from providing guidance on the timing and methods of interventions. Sharma, Wagner, and Wilkerson (2004) used the constructs from SCT to predict preventive health behavior against obesity in school children. The current study was conducted to fill a gap in the literature regarding the efficacy of SCT constructs in predicting betel nut use in secondary students.

Nature of the Study

The nature of this study was quantitative with a cross-sectional design. The cross-sectional design was chosen because it was inexpensive, allowed for the estimation of the prevalence of betel nut use, and provided information for public health interventions in the area of health promotion. Determining temporality of association was not possible in the study. To reduce selection bias, I employed random selection of participants. A cross-sectional study design including SCT was used in other studies. Dai and Sharma (2014) predicted childhood obesity prevention behaviors in elementary students in Taiwan. Dai and Sharma asserted the applicability of the SCT construct of self-efficacy in teaching students to target specific tasks. In the current study, the cross-sectional design was appropriate for examining how SCT constructs predicted decision-making in betel nut use. The SCT constructs of expectation, self-efficacy, self-efficacy to overcome barriers,

and self-control were used to predict the dependent variable of not to chew betel nut in secondary students in the Solomon Islands. Data were collected from a self-administered questionnaire completed by each participant providing information on their betel nut use and the SCT constructs. The data obtained from the survey were entered for analysis in the Statistical Package for the Social Science (SPSS) 24.0 software program. In data analysis, descriptive and inferential analyses were carried out. Descriptive statistics were used to summarize demographic and related data. For the inferential analysis, simple linear regression, multiple regression analysis stepwise method, logistic regression analyses, and multivariate analysis of variance were used for hypothesis testing.

Definitions

Adolescent betel nut user: Students in the adolescent age group who reported having chewed one or more betel quid per day and had chewed 100 or more betel quid in their lifetime (Chen, Chen, Fagot-Campagna & Narayan, 2001).

Environment: The physical or social circumstances or conditions that surround a person (Sharma & Petosa, 2014). Environment for not chewing betel nut was operationally defined as the social and physical circumstances and conditions that surround the secondary student. Social items were support from family and friends on choice not to chew betel nut, and physical items were policies made at school and community against betel nut availability and distribution. Environment was measured on the Likert scale of strongly disagree (0), disagree slightly (1), agree slightly (2), agree (3), and strongly agree (4).

Outcome expectancies: The value that a person placed on the probable outcomes that result from performing a behavior (Sharma & Petosa, 2014). Outcome expectancies about not chewing betel nut were operationally defined as the personal value placed on having better health, improved class performance, improved physical endurance, cleaner teeth, and better school lunches by the secondary students. Expectations for not chewing betel nut were obtained by multiplying outcome expectations with corresponding outcome expectancies and then summing up. Expectations for not chewing betel were measured on a scale of not important (0), slightly important (1), moderately important (2), very important (3), and extremely important (4).

Outcome expectation: Anticipation of probable outcomes that would result from engaging in the behavior under discussion (Sharma & Petosa, 2014). Outcome expectations about not chewing betel nut were operationally defined as the anticipated outcome benefits perceived by the secondary students that included having better health, improved class performance, improved physical endurance, cleaner teeth, and better school lunches. Outcome expectations were measured on the Likert scale of never (0), hardly ever (1), sometimes (2), almost always (3) and always (4).

Self-efficacy: Behaviorally specific confidence in the ability to influence a habit (Sharma et al., 2004). Self-efficacy in not chewing betel nut was operationally defined as the confidence of a secondary student in maintaining opposition to betel nut chewing, dealing efficiently with tempting events, finding solutions to study stressors, passing temptations to buy betel nut, and not chewing betel nut in the presence of other chewers.

Self-efficacy in not chewing betel nut was measured on the Likert scale of not at all sure (0), slightly sure (1), moderately sure (2), very sure (3), and completely sure (4).

Self-efficacy to overcoming barriers: Confidence a person has in overcoming barriers while performing a given task (Sharma & Petosa, 2014). Self-efficacy in overcoming barriers to not chewing betel nut was operationally defined as the ability to adhere to this position when under stress, hunger, and influence from family and friends. Self-efficacy in overcoming barriers to not chewing betel nut was measured on the Likert scale of not at all sure (0), slightly sure (1), moderately sure (2), very sure (3), and completely sure (4).

Self-control: Setting goals that are proximal and distal and set the course for change (Sharma et al., 2004). Self-control for not chewing betel nut was operationally defined as the ability of the secondary student to set goals, monitor progress, and self-reward on successful accomplishment of not chewing betel nut. Self-control for not chewing betel nut was measured on the Likert scale of not at all sure (0), slightly sure (1), moderately sure (2), very sure (3), and completely sure (4).

Assumptions

I assumed that based on the sampling method that the data collected would be generalized as a nationally representative sample. Because participants' records in the study were anonymous and their participation was voluntary, I assumed that participants would answer the surveys questions and that the data set would not contain missing information. I also assumed that the school chosen had physical education activity classes offered and that the school canteen was operational and provided daily school day

lunches. Furthermore, in relation to the use of the constructs of the SCT, I assumed that the findings of the study could be used in other settings to predict substance use.

Scope and Delimitations

Preventing or limiting the use of betel nut in young people, especially those in schools, is an ongoing challenge and a priority in health education and health-promotion departments of high-prevalence countries. Behavioral studies on the uptake of betel nut by young people were lacking in literature. In addition, predicting betel nut use through the employment of a behavioral theory was new and needed to be explored. Although SCT was used in this study, other behavioral theories could be relevant, including the health belief model, trans-theoretical model, social ecological model, and multi-theory model. The study population included secondary students in Honiara in Solomon Island and did not include all Solomon Island students studying abroad.

Limitations

The study was cross-sectional in design, so I could not assert any temporality of association. Limitations that could affect internal validity are anticipated in school-based surveys (Kristjansson et al., 2013). The self-report survey instrument to record information on self-efficacy, outcome expectations, and self-control for not using betel nut had the potential danger for inaccurate reporting. This threat was minimized by the no names being used on any data collection instruments. With the assurance of anonymity, participants were free to provide accurate responses. In addition, measurement bias could have been introduced through the self-reporting survey instrument (Kristjansson et al, 2013). To minimize possible selection bias, random sampling was employed for the

selection of subjects. Moreover, because the survey was administered over a normal school day, the threat of inaccurate recall of information related to the dependent variable was minimized. The instrument was read to participants to accommodate varying reading levels and reduce measurement bias. In relation to limitation of the theory used, the SCT did not address the biological predispositions that could have influenced participants' behavior. Sharma (2017) reported on the limitation of the SCT and that the theory does not consider the genetic differences that could lead to disparities between people's cognitive abilities and behavior. In addition, the theory does not address the complexity of human behavior, personalities, and differences apart from biological differences. These limitations were worth noting because betel nut chewing occurs in various ethnic groups and cultures within and across countries.

Significance

The study was conducted to fill a gap in the literature regarding the extent of betel nut use in secondary students and the associated factors related to its use in the Solomon Islands. Predicting behavior using behavioral theory would provide school and health authorities with information for improving interventions and actions against betel nut use. Findings from the study may be used to formulate health-promotion policies and strategies to reduce betel nut use. Williams, Malik, Chowdhury, and Chauhan (2002) reported that sociocultural and religious issues related to betel nut use were understudied but must be understood for health-promotion initiatives. The current study provided the basis for a comparison of findings of social and cultural factors related to betel nut use in the adolescent population. Regarding intervention strategies, several researchers have

studied the factors associated with the commencement and the cessation of betel nut use. Ghani et al. (2011) examined the factors associated with the commencement and cessation of betel quid chewing among Malaysians. However, studies on the prevalence of and factors associated with betel nut use in Solomon Island have been minimal. Tovosia et al. (2007) and Quinn et al. (2017) reported that the prevalence of betel nut use in the Solomon Islands was high in both young people and the adult population, and use was linked to religious affiliation, gender, alcohol, and smoking habits. These studies provided background information on the prevalence of and social habits related to betel nut use.

The use of behavioral theory in predicting betel nut use in adolescence has never been undertaken in the Solomon Islands or in countries with a high prevalence of betel nut use. Sharma (2005) reported that theory can specify methods for behavioral change, improves replication, enhances program efficiency, and effectiveness. In line with the Solomon Islands national health-promotion strategy, the study findings could be used to recommend effective strategies, targeted health education, and health-promotion initiatives on betel nut and related substance abuse for consideration by government agencies and stakeholders. Awareness of the extent of betel nut use among secondary students could prompt families and other stakeholders to strengthen their roles in supporting and protecting young people from betel nut and related substance abuse.

The positive social change implications of the study included contribution to knowledge for school health program developers, government health-promotion program educators, parents, teachers, support group managers, and researchers searching for

interventions in curbing betel nut use among secondary students. Community and stakeholder involvement and participation are essential for an effective intervention strategy on betel nut use. Stakeholders' involvement and contribution may occur through support and counseling services, including the use of a targeted setting for behavioral change. The long-term results of structured interventions may include fewer heavy users of betel nut, improved school attendance, improved nutrition, and improved oral health and general well-being of students.

Summary

Betel nut chewing and betel quid use remain a significant public health issue in countries. In Chapter 1, I discussed the prevalence of betel nut use in young people in countries of high prevalence, the adverse health effects posed by long-term betel nut use, increased health expenditures, and long-term health issues. Exogenous influences, such as peer and parental betel nut use, alcohol and tobacco marketing, lack of community and family support, weak enforcement policies, and ineffective health promotion strategies, have been found to impact betel nut control (Wen, 2002). Findings from the study may be used to develop targeted intervention strategies formulated and implemented by the Ministry of Health and stakeholders to address betel chewing in secondary students. The remainder of Chapter 1 presented the problem statement, purpose, research questions and hypotheses, theoretical framework, definitions, and significance of the study. A detailed review of the literature on betel nut use and the use of theory to predict behavior is included in Chapter 2.

Chapter 2: Literature Review

The general use of betel nut has been viewed as a significant public health problem. Chewing of betel nut in young people is an increasing problem because early and prolonged use are related to adverse health and social outcomes (Croucher, 2002). Betel nut use beginning in the adolescent period and continuing to adulthood is similar to substance use disorder that can have significant health risks. Palmer et al. (2009) observed that substance use and substance use disorder increased from adolescence to young adulthood. In addition, the use of betel nut with other substances such as tobacco and alcohol is increasing and renders substance control efforts more challenging. Health education and health-promotion efforts for betel nut use have been minimal, but combined intervention efforts with other substance use, particularly tobacco and alcohol, have been undertaken in some countries (Wen, 2005). Because of the minimal research on betel nut education and the use of behavioral theory to support health education interventions, to the current study may contribute to the body of knowledge on the use of theory to predict behavior in relation betel nut use.

There has been persistent high prevalence of betel nut use in the Asia and Pacific regions in the past three decades. Oakley et al. (2005) reported that in Saipan in the Federated States of Micronesia, 63.4% of adolescents chew betel nut and most identified as regular users. In a similar prevalence study, Milgrom et al. (2013) observed that adolescents in Yap and Pohnpei States of the Federated States of Micronesia started chewing betel nut early in life and that around 65% of those surveyed were regular users. In a study of primary school children between 4 and 16 years of age in Karachi, Pakistan,

Shah et al. (2002) found that 74% of the children had used areca nut and that 35% were daily users. These studies demonstrated that betel nut fruit and in its various preparations are introduced and used before the teenage years and that its prevalence of use remains high in certain communities.

Early initiation and persistent use of betel nut should be issues of great concern to national authorities. Trivedy et al. (2002) reported that oral submucous fibrosis, gum disease, and oral premalignant lesions are most common health complication in long-term betel nut users. In addition, long-term betel nut use has been linked to metabolic syndrome, which is a group of conditions predisposing to the development of diabetes, obesity, and kidney diseases. Metabolic syndrome is an important consideration to health authorities in the Pacific Islands because noncommunicable diseases have become the main cause of premature death in the region.

In this quantitative study, I used the constructs of SCT (expectations, self-efficacy, self-control, and environment) to predict and explain betel nut use in secondary students. Early use of SCT constructs in substance abuse prevention has been limited to tobacco and alcohol behaviors. Dai and Sharma (2014) used SCT constructs to predict modifiable risk behaviors of obesity development and concluded that SCT could be used to guide the formulation of preventive programs. In the current study, the independent variables were the SCT constructs of expectation, self-efficacy, self-efficacy to overcome barriers, self-control, and environment. The dependent variable was not to chew betel nut use. Understanding factors that predict and influence betel nut use may be important for health-promotion interventions and efforts promoting behavioral change. Facilitating

positive social change among adolescents in secondary schools and within communities was the rationale for conducting the research.

In this chapter, I present key issues that supported the study. Following the introductory statement highlighting the importance and relevance of the study topic, I discuss the dependent variable of not to chew betel nut. I then discuss SCT, including its source and use in the study and definition of the key constructs of self-efficiency, self-control, expectation, and environment. I also discuss other behavioral theories relevant to the study that were not selected. A brief discussion of the conceptual framework ensues, including its use in similar studies. Because betel nut use and its effects have not been studied extensively, I also discuss other substances such as tobacco and alcohol commonly use with betel nut. Discussions of the selection, relevance, and strength of the study design are also included.

Literature Search Strategy

My literature searches of materials related to betel nut use started in 2012. In the Walden University library, the databases accessed for the review of literature included CINAHL Plus with Full Text, MEDLINE with Full Text, PubMed ProQuest Nursing and Allied Health Source, ProQuest Research Library, SAGE Full-Text Collection, and Science Direct. Internet search engines such as Google and Google Scholar were also used. In addition, the WHO library and selected government sources of data from the Internet, including the Centers for Disease Control and Prevention, were accessed for betel nut and substance abuse information.

The initial search of the literature included the following key words/phrases: *areca nut, betel nut, adolescent, high school students, social cognitive theory, health behavior theories, predicting behavior, substance abuse,* and *health interventions*. Next, I combined these key words/phrases with SCT. I then expanded the search by combining SCT constructs with other key terms. For example, I combined *self-efficacy*, *outcome expectations*, *self-regulation,* and *environment* with *predicting use*.

Search of measurement instruments related to the study was also undertaken. I searched for instruments that had been used to measure substance use and the relevant SCT constructs. To identify instruments for substance use, I combined the terms *measurement* or *scales* with the words/phrases *betel nut use* and *substance use.* I also searched instruments for SCT using the constructs of *self-efficacy, outcome expectations, self-regulation,* and *environment*.

I found minimal research addressing factors predicting secondary students' acceptance and use of areca or betel nut. However, some studies addressed the prevalence, initiation, and related factors such as parental use, tobacco, and alcohol use in the population including school children. Some researchers examined economic factors related to betel nut cultivation and the changing consumer demand for the product. Other researchers investigated the long-term medical effects of betel nut use. Most of the studies related to betel nut use were from 1951. In a recent study, Yang and Lin (2016) used a grounded theory approach to interview male taxi drivers who had quit betel nut chewing for more than 6 months.

As earlier stated, with limited literature on betel nut use interventions, additional information relevant to the Pacific Region were found in the meeting reports of WHO. The WHO (2012) official technical report on areca (betel) nut and tobacco use in the Pacific was very useful to substantiate the prevalence and burden of betel nut use in the Pacific Islands. Some technical reports of annual scientific meeting of colleges such as the Australasian College for Emergency Medicine, were also viewed.

Theoretical Foundation

In this study I used the SCT as the theoretical base of the research and later application. The origin and development of the theory started in the early 40s when Miller and Dollard (1941) proposed the theory of social learning and imitation. The theory was further developed and known as the social learning theory (SLT) primarily by Rotter in 1954. In 1963 Bandura and Walters broadened the social learning theory with the principles of observational learning and vicarious reinforcement. The theory was further refined by Bandura in 1977 with the concept of self-efficacy included. Bandura (1986) further revised and renamed SLT as SCT with emphasis on the cognitive aspect of learning and behavior change.

The SCT was chosen for this study as most of the models of health behavior are concerned only with predicting health habits but do not identify means to change health behavior. SCT offers both predictors and principles on how to inform, enable, guide, and motivate people to adapt habits that promote health and reduce those that impair it (Bandura, 1997). In addition, the SCT can also be used to assess the impact that exogenous influences have on adolescent in betel nut initiation among high school

students and self-efficacy as it pertains to betel nut cessation and intervening effects. Predicting behavior is a process from which effective intervention could be planned and undertaken. The SCT is also relevant for designing health education and health behavior programs. This theory explains how people acquire and maintain certain behavioral patterns (Bandura, 2004).

Literature Review Related to Key Variables

Betel Nuts and Betel Leaves

Describing the substances Beecher, Hartman, and Christen (1985) explained that betel nut and betel leaves come from different families of trees and plants. Betel nut is the fruit of the plant *Areca catechu* from the Malaysian palm sub tribe *Arecinae* and contain the active ingredients of the alkaloids, arecoline, and arecaidine. Although the areca palm and betel vine grow well in the Pacific Islands region, the World Health Organization (WHO, 2012) stated that the Solomon Islands and the northern islands of Vanuatu are the southernmost extension of betel nut chewing habit. Geographically, betel nut chewing is popular and widespread in tropical and subtropical areas, which includes Africa, India, Pakistan, Nepal, South East Asia, Southern China, Taiwan, and the Pacific islands especially New Guinea, Solomon, and Guam (Chen & Waigandt, 2009).

Separately, betel leaves are from the betel vine of the piper betel and have important medicinal, religious, ceremonial, and recreational purposes. Malaysia is the most likely country of origin of betel vine but its cultivation is now widespread to countries such as India, Sri Lanka, Bangladesh, Burma, and Nepal (Kumar et al., 2010). Betel leaves when used in combination with betel nut, slaked lime, and often tobacco is

called betel quid. When betel nut is chewed or used in combination with betel leaf lime, and sometimes tobacco and spices, the palm nut becomes a mild narcotic and primarily a stimulant. Numerous studies have shown that betel quid is linked to cancer of the oral cavity (Brunnemann & Hoffmann 1992; IARC, 2004). However, scientific studies have also reported that betel leaf when chewed alone was devoid of mutagenic and carcinogenic effect and may also prevent chemical induced cancers (Rai et al., 2011).

Studies in relation to the key independent variable have focused largely on the prevalence of use, cultural and related factors to initiation, outcomes of long-term use, socio-economic factors related betel nut use. In relation to the prevalence of use, chewing betel nut is a common practice in South Asia and in the Pacific region especially in parts of Micronesia and Melanesia (Gupta & Warnakulasuriya, 2002).

Health Effects of Betel Nut Use

Adverse effects of betel nut use are very well known and documented in literature. The International Agency for Research on Cancers (IARC) has classified areca nut as a carcinogen under Group 1 in its cancer risks classification. Out of the medical complications of chronic betel nut use, oral sub mucous fibrosis is the most prominent and common to all regions of betel nut prevalence. Affecting the oral cavity and the upper digestive tract, oral sub mucous fibrosis is an insidious precancerous condition linked directly to betel nut chewing (Aziz, 2010). Apart from oral sub mucous fibrosis, betel nut use is also linked to other adverse health effects and could also negatively affect the health of pregnant women. Ome-Kaius et al. (2015) reported that anemia was a prominent effect of betel nut chewing in a prospective cohort of pregnant women in

Madang Province, Papua New Guinea. In addition, Heck et al. (2012) in a population-based prospective study of 19,934 Bangladeshi adults, determined that the chewing betel quid without tobacco was associated with general hypertension and systolic hypertension. Separately, Tseng (2010) expanding on earlier studies, confirmed that betel nut chewing was associated with a higher risk of type 2 diabetes. After excluding confounding variables such as obesity and parental diabetes, Tseng further concluded that the habit of chewing betel nut can also be diabetogenic in humans. In addition, Shafique et al. (2013) reported that areca nut chewing and metabolic syndrome have a harmful relationship that could have a more deleterious effect when tobacco additives were used together. Shafique et al. (2013) also stated that pre diabetes, abdominal obesity, high cholesterol level, and high blood pressure are grouped together as signs of and components of metabolic syndrome. Separately, suppression of hunger, which may be experienced by long-term areca nut users, could lead to malnutrition and Vitamin-D deficiency (Ogunkolade et al., 2006). In addition, Ogunkolade et al, (2006) further stated that Vitamin-D deficiency was a risk factor in many systemic diseases including metabolic syndrome and diabetes mellitus.

Acknowledging that betel nut use can lead to dependence was important to health promotion program planning. Benegal, Rajkumar and Muralidharan (2008) in their study on psychiatric patients in India reported that about two out of five persons using areca-nut preparations developed a recognizable pattern of dependence, satisfying both the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV) module for substance dependence (38.8% of areca users) as well as International Classification of Disease 10

(ICD-10) criteria for current dependence (40.8% of areca users). In addition, Mirza, Shafique, Vart and Arain (2011) in their study in Pakistan reported that dependency syndrome was significantly related to areca nut use. Moreover, Mirza et al. (2011) asserted that betel nut withdrawal syndrome although relatively muted, has the characteristics and general pattern expected in stimulant withdrawal. The addictive potential of betel nut was further demonstrated by the reported unsuccessful attempts at abstinence by a large group of users even in the absence of any socio occupational dysfunction (Mirza et al., 2011). Indeed, the rate of dependence increased when betel nut is used alongside tobacco.

Sociocultural and Economic Aspects of Betel Nut Use

There are socio cultural linkages in relation to betel nut use in all regions where the nut has been traditionally used. Croucher and Islam (2002) reported that in indigenous communities in South East Asia, East Africa and the Western Pacific, betel nut use behavior and practice are important expression of social and cultural identity. In the island of Guam and Micronesia as a whole, betel nut use is part of socializing and where mature nuts are offered by itself to guests (Pobutsky & Neri, 2012). In some cultures, betel nut sharing is an example of courtesy when greeting or to farewell a visitor apart from means of facilitating relaxed behavior. Strickland (2002) stated that betel nut use, regardless of the relative social standing, resembled a form of token commensality. Separately, betel leaves are important because of their medicinal, religious and ceremonial value in Southeast Asia. Rai et al. (2011) reported that in India, it is a

customary practice to serve betel leaves to guests whether they are for social, cultural or religious reasons. The offer of betel leaves was also a mark of respect to guests.

Many communities have benefitted from the cultivation, marketing and sales of betel nut and its products. Croucher and Islam (2002) reported that in India because of high market demands, the cultivation practices for the areca palm has changed to that necessitating the recruitment of permanent labor force to tend to the trees. Furthermore, trade in betel nut and products are lucrative business venture. For example, in a setting in East London, betel nut sales can yield an estimated £1 million per year (Croucher & Islam, 2002). In addition, Croucher and Islam stated that the sale of betel nut and related products in India can yield and estimated 61 million dollars annually. However, arguing and supporting control measures Croucher and Islam proposed that to effect individual consumption, there should be changes in social and economic policies which could negatively impact cultivation and marketing practices. Because betel nut is often used in combination with other substances such as alcohol and tobacco, the marketing of these other substances could also impact betel nut uptake and use.

The association of use of betel nut with tobacco and or alcohol are well recorded in literature. Indeed, it has been established that smoking and betel nut chewing behaviors are closely related habits. Wen et al. (2005) in their study in Taiwan revealed that nearly 93% of the country's betel nut users were also smokers. Furthermore, Wen et al. (2005) also found that 94% of smokers and betel nut users either began smoking first or took up both habits simultaneously. Elaborating further, WHO stated that the aggressive marketing of tobacco products had resulted in increased use and also its use in

combination with betel nut. Tobacco use with betel nut is accomplished when either added to the betel quid or that a smoking coexists with the betel nut chewing habit (WHO, 2012). Separately Guo et al. (2013) in their study of health promoting behaviors in Taiwan, found that betel nut chewers were more likely to smoke cigarette and consume alcohol and generally have poor health promoting behaviors including poor oral hygiene.

Betel Nut Use Interventions and Control

There are a few health education interventions on betel nut use documented in literature. Wang, Tsai, Huang and Hong (2007) discussed the effects of prevention intervention for betel nut chewing in school and where they concluded that health education can enable students to select better options than from the use of betel nuts. Theories have also been used to predict behaviour in health education and intervention programs. The health belief model and the SCT are popular theories in health education and have been used to strengthening intervention strategies in health promotion. Tareg, Modeste, Lee and Santos (2015) used the health belief model in Yap, Micronesia to explore perceptions of tobacco use and chewing betel nut. Their study determined that because of perceived social and withdrawal problems, most adults felt quitting would be difficult (Tareg et al., 2015). In addition, Dai and Sharma (2014) used the SCT to predict prevention behaviors on childhood obesity for elementary school students in Taiwan. According to Dai and Sharma (2014) the study asserted that the SCT can provide a useful basis for preventive health program specific to the group. However, the use of theory including the SCT to predict behavior in betel nut use has not been tested and reported in literature.

Control of betel nut use is legally unregulated in most countries of high prevalence of use. In the Pacific Island Countries, whatever policies and laws developed were mostly in relation to the spitting of betel nut quid in public places especially in health care facilities and schools (WHO, 2012). However, the legislature in the Marshall Islands through law in 2010, banned the importation, distribution and sale of betel nut in the country. The WHO also reported that unpleasant and unsightly spitting habit and the expectorated by products of betel nut quid were the driving force cited by legislators for this law. Controlling betel nut use through taxation has been another strategy tried. In Taiwan, Chen et al. (2010) demonstrated the existence of cross-price elasticity of betel nut and cigarette consumption where a proposed betel nut health tax could reduce cigarette consumption. Chen et al. (2010) further stated that the betel nut tax, once enacted, could provide an additional platform for harm reduction strategies in relation to cigarette consumption. At least, legalized control measures and enhanced health promotion strategies against betel nut use are important components in any national efforts to reduce and limit betel nut use in the general population especially in young people.

Theories in Health Behavior

Glanz and Bishop (2010) stated that the SCT, the trans theoretical model (TTM), the health belief model (HBM) and theory of planned behavior were the most commonly used theories of health care. Sharma (2015) proposed a new theory called the multi-theory model (MTM) for behavioral change and which has been empirically tested. The MTM can be applied to behavior change at individual, group, and community levels and

is particularly well suited for resource-scarce settings (Sharma, 2015). Furthermore, Painter et al., (2008) in their review of health behavior researches from 2000 to 2005 that included and used theory, concluded that the theories most-often-used were TTM, SCT and HBM. The HBM was one of the first theories of health behavior and remained one of the most widely recognized in the field. The key constructs of the HBM are, perceived susceptibility and perceived severity, perceived benefits and perceived barriers, cues to action, and more recent addition of self-efficacy (Rosenstock, Strecher & Becker, 1988). Applications of the HBM have been aligned to health concerns that are preventable and asymptomatic where peoples' beliefs were as important as or more important than overt symptoms (Glanz & Bishop, 2010). However, criticism on the HBM have been on the conceptual basis where the theory had been identified as lacking good consistent predictive power, was not culturally versatile, and was not about changing health behavior but only explaining it (Ogden, 2003, as cited in Sharma, 2015).

The TTM proposed that long-term changes in health behavior involved multiple actions and adaptations over time. The theory recognized that people vary in their readiness and attempts to change any undesirable behavior and to adopt healthful options. The construct of stage of change is a key element of the TTM of behavior change and proposed that people are at different stages of readiness (Prochaska, Redding & Evers 2008). Application of the stages of change model can be used to help understand why people who are at high risk for a disease might not be ready to attempt behavioral change and heed to health counseling (Glanz & Bishop, 2010).

The SCT identified human behavior in terms of a three-way, dynamic, reciprocal model in which personal factors, environmental influences, and behavior continually interact (Bandura, 1986). A basic premise of SCT is that people learn not only through their own experiences, but also by observing the actions of others and the results of those actions (Bandura, 1986). Key constructs of SCT that are relevant to health behavior change interventions include observational learning, reinforcement, self-control, and self-efficacy. In addition, some elements of behavior modification based on SCT constructs of self-control, reinforcement, and self-efficacy include goal-setting, self-monitoring, and behavioral contracting (Glanz & Bishop, 2010).

Use of SCT Construct in Betel Nut Chewing Behavior

SCT specifies a core set of determinants, the mechanism through which they work, and the optimal ways of translating this knowledge into effective health practices (Bandura, 2004). For the dependent variable I focused the literature review at studies based on the five selected constructs of SCT. In my study, the constructs of self-efficacy, expectations (outcome expectation and expectancies), self-control or self-regulation, and environment was used to predict betel nut chewing behavior in high school students. My literature review showed a dearth of studies using the constructs of SCT in any betel nut use behavior, health promotion, and health interventions researches. However, a large volume of studies has been conducted on the outcome variable of betel nut in relation to its prevalence of use, health complication, and effects of addiction as related to socio, economic, religion, parenting, peer pressure, etc. In my literature review I have aligned betel nut use with substance use particularly cannabis, cigarette smoking, and alcohol.

Researches using the key SCT construct to predict substance use behavior were prioritized for discussion.

Potential Relevance of Self-Efficacy in Betel Nut Use Behavior

Bandura (2012) outlined that self-efficacy reflects the self-belief that one's effort could produce the desired change. In addition, Bandura (1997; 2012) stated that the self-efficacy portion of SCT addresses the origin of self-efficacy beliefs, their structure and functional properties. In further clarifying the concept of self-efficacy as expounded by Bandura, Hawkins (1992) stated that self-efficacy is a useful hypothetical construct for predicting behavior, but that it had no valid claim to being a cause of behavior.

Sharma & Romas (2012) outlined that self-efficacy can be operationalized by breaking down a behavior or action into smaller achievable steps, such as using role models' demonstrations, the use of persuasion and reassurance, and reducing stress. Efficacy beliefs influence goals and aspirations and as such, the higher the goals people set for themselves and the firmer their commitment will become (Bandura, 2004). In addition, goal setting is a precondition for self-regulation as it provides the objective to be achieved and a benchmark for the assessment of progress (Sharma & Romas, 2012). Self-efficacy scales are unipolar, ranging from zero to a maximum strength of belief (Urban, 2006).

Refusal (or abstinence) self-efficacy, which is the belief in the ability to refuse an abused substance, has increasingly received much research attention. My research used refusal self-efficacy on betel nut chewing behavior. Low refusal self-efficacy was hypothesized to undermine motivation for abstinence and predict poorer outcomes

(Bandura, 1999; Oei and Baldwin, 1994). Although drug-related outcomes expectancies and refusal self-efficacy are core components of SCT, only a few studies have reported both expectancies and refusal self-efficacy in cannabis dependence. Gullo, Matveeva, Feeney, Young, & Connor (2017) tested the predictive role of expectancies and refusal self-efficacy in treatment outcome for cannabis dependence. From a sample of outpatients at a university hospital alcohol and drug outpatient clinic, Gullo, Matveeva, Feeney, Young, & Connor (2017) determined that emotional relief refusal self-efficacy and negative expectancies are predictive of better treatment outcomes for cannabis dependence.

Employing self-efficacy in health education intervention, Wang, Tsai, Huang & Hong (2007) explored the effects of preventive health education intervention in the knowledge, attitude, practice of betel nut chewing, and self-efficacy of anti-betel nut chewing for adolescent students in Taiwan. This study determined that there was significantly difference among pre-tests, post-tests, and post-post-test after intervention in the attitude, practice of betel nut chewing and self-efficacy of anti-betel nut chewing behavior (Wang, Tsai, Huang & Hong, 2007). The study concluded that health education enabled students to better resist betel nut use and reaffirmed its importance in dealing with the health risk of betel nut chewing (Wang, Tsai, Huang & Hong, 2007).

Potential Relevance of Expectation in Betel Nut Use Behavior

Lowenstein et al., (2013) stated that outcome expectation has a positive relationship with self-efficacy. Outcome expectation is about the expected costs and

benefits for different health habits and is linked to outcome expectancy which describes the value placed on the desired outcome following a behavior or action (Bandura, 2004; Sharma & Romas, 2012). According to Bandura (2004), there are three possible outcomes to be expected following engaging in the behavior. These outcomes areas include the following; physical outcome, which comprises of both the good and bad results following a behavior or action, approval or disapproval by peers, and finally self-evaluation, which could be either positive or negative (Bandura, 2004). The outcome expectations could be improved on through education on the behavior of importance; as the expectations increases, the likelihood of acquiring the desired behavior increases (Bandura, 2011; Sharma & Romas, 2012). Outcome expectation is important in making the decision regarding engaging in behavior or action.

Outcome expectancy is linked to outcome expectation as it describes the value placed on the desired outcome following a behavior or action (Sharma & Romas, 2012). Alcohol studies have demonstrated the theoretical and clinical utility of applying both SCT constructs. Connor, Gullo, Feeney, Kavanagh & Young (2014) examined the relationship between refusal self-efficacy and outcome expectancies in a sample of cannabis users in an alcohol and drug out-patient clinic. The research finding was consistent with SCT as refusal self-efficacy mediates part of the association between cannabis outcome expectancies and cannabis use. (Connor, Gullo, Feeney, Kavanagh & Young, 2014).

Parental role in communicating high-risk sexual behavior among adolescents have been highlighted in many studies and forums. Despite the research, parents reported a

lack of confidence in their ability to answer sexually related questions with adolescents. Weekes, Haas, & Gosselin (2014) tested the effect of a multimedia intervention on outcome expectations and perceived self-efficacy for the sex educator role for parents of African American adolescent males. Findings indicate that using a multimedia approach may be effective in improving parents' outcome expectancy and self-efficacy for talking about sex with adolescent sons.

Potential Relevance of Self-Control in Betel Nut Use

Self-control is personal regulation of the performance of a behavior and represents explicit and specific goal setting abilities for accomplishing a behavior (Bandura, 2004). Self-control is also the ability to control one's actions in the absence of external reinforcement or punishment. Bandura (1997) identified the importance of self-regulation on the change of conception of health from a disease model to a health model. Influenced by lifestyle habits and environmental conditions, self-management of health habits reduce health risks leading to healthier and more productive lives (Bandura, 1997).

Studies have shown that a high level of self-control was positively related to other adaptive traits such as self-esteem or good interpersonal skills, and negatively with alcohol abuse (Tangney, Baumeister, & Boone, 2004). Lee, McClernon, Kollins, Prybol, & Fuemmeler (2013) conduct a study to assess the mediating roles of self-control, positive parenting and also the influence of childhood economic strains on substance use during adolescence. The study finding determined that self-control was negatively affected by economic strains and serves as a mediator between poverty and risk of regular smoking (Lee, McClernon, Kollins, Prybol, & Fuemmeler, 2013).

In a separate study, Priest, Knowlden, & Sharma (2015) used the SCT construct of knowledge, expectations, self-efficacy, situational perception, self-efficacy in overcoming barriers, and self-control to predict human papillomavirus (HPV) vaccination intentions in college men. The research findings determined that situational perception and self-control were significant predictors, for college men accessing HPV (Priest, Knowlden, & Sharma, 2015).

In relation to substance use, Wills et.al, (2008) tested the prediction that self-control would have buffering effects for adolescent substance use (tobacco, alcohol, and marijuana). In the study sample of 6th and 9th graders in a public school, the findings showed that the risk factors on substance use was reduced among persons with higher scores on good self-control (Wills et.al, 2008). Implications for addressing self-control in prevention programs were highlighted in this study. Self-control has yet to be tested against betel nut use behavior and it would be interesting to determine any such relationship in my research.

Potential Relevance of Environment in Betel Nut Use Behavior

The SCT subscribes to a casual structure grounded in triadic reciprocal causation where human functioning is a product of the interplay of intrapersonal influences, the behavior individuals engage in, and the environmental forces that impinge upon them (Bandura 1986, 2012). In addition, Bandura (2012) stated that the environment was not a monolithic force and are of three types namely; imposed, selected, and constructed. People choose and create environment that allows them to exercise better control of their lives (Bandura, 2012). Furthermore, McKenzie, Blandford, Menec, Boltz, & Capezuti

(2011); Papastavrou et al. (2014), clarified that there are variations in the perception of the environment and could be attributable to demographic and cultural differences.

Eslami, Norozi, Hajihosseini, Ramazani, & Miri (2017) used the SCT as theoretical framework to predict sustained abstinence in a pool of 269 Iranian substance users. Issues such as individualistic and social/environmental factors appear to determine whether or not individuals can successfully quit substance use. The effects of SCT of treatment motivation, perceived social support, drug avoidance self-efficacy, and drug quitting outcome expectations were assessed using logistic regression method. In this research, Eslami, Norozi, Hajihosseini, Ramazani, & Miri (2017) determined that the predictors of abstinence were perceived social support, treatment motivation, prior substance use treatment, and age of onset of substance use. In addition, substance use treatment outcome was not influenced by drug avoidance self-efficacy, drug quitting outcome expectations, and demographic variables (Eslami, Norozi, Hajihosseini, Ramazani, & Miri, 2017).

Alcohol and Smoking as Covariates of Betel Nut Use

According to Salkind (2010), covariates are similar to an independent variable and complementary to the dependent, or response variable. In addition, Salkind clarified that variables that are measurable and considered to have a statistical relationship with the dependent variable can qualify as a potential covariate. Covariates therefore could be possible predictive or explanatory variable of the dependent variable (Salkind, 2010).

In betel nut chewing, important covariates include race, gender, alcohol and cigarette smoking and illicit substance use. My study population was very much of a one

island country ethnic group and where illicit drugs are not readily available or commonly used. However, cigarette smoking was a very common practice in the adolescent and adult age groups. The 2008 Global Youth Tobacco Survey on 13-15-year-old in the Solomon Islands reported that two in 5 students used some form of tobacco and with 24.2% reported as current cigarettes smokers (Warren, Lea, Lee, Jones, Asma, & McKenna, 2009).

In relation to the use of the covariates in betel nut use studies, Lin, Wang, Chen, Chang, Yang, and Ko (2006) examined the socio-demographic factors in betel quid chewing behavior and cessation patterns in Taiwan aborigines. The research findings reported that tobacco and betel nut quid use were independently and positively associated with alcohol drinking. Furthermore, tobacco smoking, betel quid chewing, alcohol drinking, and illicit drug use were higher for males and with the use of these different substances found to cluster (Lin et al., 2006). For betel nut interventions, the research finding proposed that program to encourage cessation of betel quid chewing should include efforts to reduction habitual alcohol use and cigarette smoking (Lin et al., 2006). In my study I included alcohol and smoking as covariates that was analyzed and considered alongside the SCT in relation to betel nut chewing.

Study Design

Based on the literature review, qualitative and quantitative methods have been used to assess betel nut use and predict behavior in young people, especially the adolescent. Most recent qualitative study on the dependent variable was in relation to its use by immigrant communities from the endemic areas. Auluck, Hislop, Poh, Zhang and

Rosin (2009) reported that according to the 2006 Canadian census, the South Asian community was the largest and fastest growing minority groups in Canada. Apart from bringing in skills that can promote Canada's economy and cultural diversity, the immigrant communities also have lifestyle habits such chewing betel nut that may lead to serious health issues. Furthermore, Auluck, Hislop, Poh, Zhang and Rosin (2009) discussed the implications of the sociocultural beliefs, knowledge and practices regarding betel quid/areca nut chewing, in relation to oral cancer screening among the immigrant population.

In past studies quantitative cross-sectional studies have been used to assess prevalence of betel nut use in several target populations. In addition, there have been several clinical based quantitative studies undertaken on the medical long-term effects of betel nut use. Quantitative methods have also been used in studies to predict behavior using the SCT. As an example, Sharma, Wagner and Wilkerson (2004) used the SCT constructs (expectations, self-efficacy, and self-control) to predict health promoting behaviors related to obesity reduction in upper elementary school children. The study determined that at least one construct from SCT was a significant predictor for each of the four behaviors (Sharma, Wagner, & Wilkerson, 2004). Whilst the Sharma study showed that at least one of the SCT construct did predict behavior, a similar study conducted in Iran was not very positive. Bagherniya, Sharma, Mostafavi and Keshavarz (2015) found that none of the SCT constructs (self-efficacy, social support, outcome expectations, and outcome expectancies), were found to be significant predictors of overweight and obesity behaviors in adolescent girls in Iran.

I have selected the cross-sectional study design to answer my research questions as well as to test my stated research hypotheses. Frankfort-Nachiams & Nachmias (2008) stated that the use of cross-sectional study design is useful for the description of association patterns between variables. In addition, Levine (2006) stated that cross-sectional studies can generate a lot of information that would be useful in the assessment of outcomes as well as risks factors.

Advantages of the cross-sectional study design are that studies are conducted in a natural setting which increases external validity and there are less ethical issues in relation to participants' assignment to study groups (Frankfort-Nachiams & Nachmias, 2008). In addition, Creswell (2013) stated that with no randomization of participants to groups and no expected follow up of participants, the cross-sectional designs are cheaper and easy to administer. Also as no follow-up of the study population would be required, attrition bias is not expected to an issue in the analysis. Babbie (2015) stated that cross-sectional studies have been useful in public health policy development and planning. The latter was important in my study as health promotion policies could be influenced by the findings of the study.

Limitation to the use of cross-sectional design relates to its inability to establish a cause-effect relationship (Campbell & Stanley, 1963; Creswell, 2013; Frankfort-Nachiams & Nachmias, 2008; Levin, 2006; Woodward, 2013). In addition, and due to the lack of randomization of the participants it may be problematic to generalize the findings of cross-sectional studies to the general population (Creswell, 2013; Frankfort-Nachiams &Nachmias, 2008; Levin, 2006). The periods before and after the study are usually not

taken into consideration but would be helpful in the discussions and presentation of the study findings.

In summary, quantitative cross-sectional studies were used to provide insights into reasons why people quit and remained free after a history of betel nut use. Quantitative research remained the preferred and common method used by researchers for studies related to behavior prediction using theory. This study was best served through the use of a quantitative cross-sectional design as it could both predict and determine factors related to betel nut.

Summary and Conclusions

In this chapter, I have provided some discussion on the current known studies and knowledge regarding the endemicity and impact of betel nut use and the behavioral science theories. I have demonstrated that the use of betel nut was common in the adolescent age group in endemic countries and remains a significant public health issue. There have been several studies undertaken to determine prevalence of use and related socio-economic factors related to betel nut use. In comparison to alcohol and tobacco, uptake of betel of nut happens a lot earlier in life and could be used for a longer period of time. In addition, betel nut was often used with alcohol, tobacco and other substances making control efforts more challenging. The use of betel nut in adolescent and early adulthood, irrespective of the cultural setting, was a risk for increase morbidity and mortality if the habits are not discontinued. I have shared in this chapter that whilst the medical long-term complications of betel nut use are well researched, health education and health promotion inventions studies have been minimal.

There are no known studies that used the constructs of SCT to predict betel nut use in adolescents or high school students. The rationale for conducting this study was to provide information to health planners and educators on effective intervention strategies, based on the principles of Bandura's SCT, which could be developed for adolescents in schools. This doctoral investigation will assist in filling the gap in the scholarly literature about the use of the SCT constructs in predicting betel nut use in high school students. This knowledge can later be used to improve health education and health promotion interventions in the school setting. In the following chapter, I presented the research design, sampling, research instrumentation, data collection and analysis.

Chapter 3: Research Method

The purpose of this quantitative study was to examine whether the constructs of SCT (expectations, self-efficacy, self-control, and environment) predict and explain betel nut use in secondary students in the Solomon Islands. I examined the possible factors influencing adolescents' decisions to chew the nut. The rationale for conducting the study was to facilitate positive social change among adolescents and within communities by strengthening health education and health-promotion interventions based on a behavioral approach.

Predicting influences on betel nut use may provide a good basis for designing interventions aimed at behavior modifications, decision-making, and coping mechanisms. The use of behavioral theory to predict behavior has been employed in previous studies. Dai and Sharma (2014) used the SCT constructs of self-efficacy, expectations, and self-control to predict each of the four modifiable risk behaviors of obesity development, namely daily physical activity, limiting screen viewing, drinking more water, and consuming adequate fruits and vegetables. However, the use of SCT in substance use prevention behaviors has been limited to tobacco and alcohol use. Factors that have been identified to impact control and intervention efforts in tobacco use included the age of initiation, parental use, socioeconomic status, and history of tobacco use. In understanding issues related to betel nut initiation and cessation, Ghani et al. (2011) reported that gender, age, ethnicity, and smoking history were important factors influencing commencement while the type of quid chewed was an important factor for cessation.

The current study addressed modifiable behavioral factors on betel nut chewing that could be targeted by the Ministry of Health for health-promotion intervention efforts. Dai and Sharma (2014) concluded that SCT could be used to guide the formulation of preventive programs specific to elementary school students in Taiwan. In the current study, I used the SCT constructs of expectation, self-efficacy, self-control, and environment as the independent variables in predicting the dependent variable of not to chew betel nut in secondary students in the Solomon Islands. Covariates that are known to influence the dependent variables include gender, ethnicity, religion, alcohol use, smoking, and parental substance use (Lin et al., 2006). However, only alcohol and cigarette smoking were analysed in this study.

In this chapter, I present the research design and rationale. I also introduce the dependent and independent variables and discuss potential covariate variables. The methodology used in the study, including the data instruments, instrument formulation and validation, and analysis plan, is also discussed. Finally, I discuss threats to validity and ethical procedures related to the study.

Research Design and Rationale

I chose the cross-sectional design as the quantitative methodology for the study. The independent variables were the SCT constructs of expectation, self-efficacy, self-efficacy to overcome barriers, self-control, and environment. The dependent variable was not to chew betel nut in secondary students in the Solomon Islands. Tovosia et al. (2007) identified that smokers were more likely to be betel quid chewers in the Solomon Islands, so the moderating variables of smoking and alcohol were included in this study.

I selected the quantitative approach because it aligned with the postpositivist worldview, which was connected to the research questions. In the postpositivist scientific method, theories are conceptualized and instruments are formulated for data collection to support or refute the hypothesis (Creswell, 2014). In addition, the quantitative method allows for testing and examining of objective theories and relationships among variables using numeric values to represent behaviors, beliefs, and attitudes (Creswell, 2014). In my study, the quantitative method was used to examine whether betel nut use was predicted by the theoretical constructs of SCT.

Creswell (2014) stated that in a quantitative study, data are analysed to answer a research question and hypotheses are included to indicate what the researcher suspects the results may show. My study addressed whether betel nut use was predicted by SCT constructs, so the quantitative approach was appropriate. The cross-sectional design was not expected to require much time or resources. The secondary schools selected are located in one education district of one island in the Solomon Islands. The education district choice was made to provide greater control over sampling. The survey dates and time were scheduled by the school management, and questionnaire administration was limited to not more than 1 hour. Because of the cross-sectional design, generalizability of findings was limited to the sampled population. Furthermore, findings indicated correlation, not causation.

The data were collected using an instrument that measured behavior and attitudes, and data were analyzed using statistical procedures. Because of the choice of research design and instruments, the study could be replicated in another setting to determine

whether a different environment yielded similar findings. Such research would advance knowledge in betel nut control, especially from health education and health-promotion perspectives. Replication also allows for comparison of information across national boundaries and within different ethnic groups and socioeconomic classes. However, causal relationships could not be determined.

Methodology

Population

The research was conducted in the Solomon Islands and involved secondary students in an education district. The Solomon Islands is a nation of over 800 islands located between the countries of Vanuatu in the South East and Papua New Guinea in the West. Based on the 2009 population census, the country had 515,870 citizens living in the nine major island groups. The island of Guadalcanal is the most populous with 30.6% of the country's population living on the island. The ethnic composition of the population includes 93% Melanesian indigenous people who are grouped according to their island of origin under the Provinces of Central, Western, Guadalcanal, Malaita, Choiseul, Temotu, Rennel Bellona, Makira Ulawa, and Isabel. The islanders are mainly Christian in their religion and can be grouped under various Christian denominations.

The target population of the study included students in Year 12 attending secondary school. Year 12 students are well represented in secondary schools because the grade is before Year 13 when students can choose to enrol in the tertiary education system or move abroad for further education. The study site city has a population of

around 90% indigenous people with a mixture of other Pacific Island ethnic groups. Asians and Whites making up the remaining school population.

An estimated target population size of 152 students was selected from randomly selected school in the Solomon Islands. Sharma, Wagner and Wilkerson (2006) in their study using the SCT to predict childhood obesity prevention behavior in upper elementary children, selected a sample of 159 fifth grade students. In a separate setting, Dai and Sharma (2014) used a sample of 222 students in their study using the SCT to predict childhood obesity prevention behaviors in elementary school students in Taiwan. In the latter study, the sample size was obtained using G*Power (Erdfelder, Faul & Buchner, 1996). Since no previous studies have been conducted to predict betel nut use behavior, determination of the target population size in my study was made using G*Power analytic tool.

Sampling and Sampling Procedures

For the study a quota convenience sampling procedure was undertaken. The convenience sampling is a non-probability sampling method (Sharma & Petosa, 2014, p. 232). The quota convenience sample is useful for theory testing and that my research was not a survey study in which non respondents would be considered for generalizability. Moreover, the purpose of this study was to test the applicability of theory so a quota sample was justified based on previous such research (Bennett et al., 2018; Cooper et al, 2016)

There are seven secondary schools in the selected education district of the study with an estimated 80 students in Year 12 class in each school. This number of students

needed for the survey was accommodated in 2 -3 classes and 3 secondary schools met the required student number. Earlier, the sampling procedure involved random identification of the 18 secondary schools and with the selection of Year 12 students from the chosen schools made from the class roll alphabetical listing of their family name.

The schools and Year 12 are specific target population groups or clusters and from which the study sample was selected. It is important to note that the choice of high school student as the study population was related to the use of the research findings to improve health promotion interventions against betel nut use in schools. The final participants list was determined from volunteering and consenting students to the study.

In the selection of participants in a school where more than one Year 12 class existed, the whole Year 12 student roll was grouped together and the required study number drawn from the alphabetical list of students' family name. This procedure was necessary as most schools have at least two streams of Year 12 students. To meet the study population number of 152, a total of 50 students were selected from schools #1 and #2 and with school #3 providing the remaining 52 students. As previously mentioned students were invited to participate in the study and only consenting students were in the final selection list.

The inclusion criteria for participation in the study were a 12th-grade student in the selected high school and in the chosen school district, having either given consent or assent or with parental consent. The student also attended a briefing session on the survey objectives including benefits and use of the research findings. Exclusion criteria of participation were those students that do not meet the inclusion criteria and also those that

do not provide complete answers to any one of the listed questions in the survey questionnaire.

A possible reason for non-participation in this setting may relate to participants viewing the survey as time consuming and demanding of them. Galea and Tracy (2007) stated that participants may be wary of committing their involvement to an endeavor that was likely to take up a substantial amount of their time as a reason for non-participation. In addition, Galea and Tracy (2007) clarified that higher participation rates have been reported in studies where face to face recruitment and data collection was involved in contrast to studies relying on telephone or other forms of contacts. My study was classroom based with students recruited from pre-selected schools and classes. As such the participation rate was high along with the questionnaire completion rate. With no similar school based studies done in the past on the SCT and betel nut use, I over sampled the study by 10% to cater for non-responses. Analysis and discussion on this over sampling determination and subsequent outcome are presented in the results section of the study for information and future references.

Cohen (1992) identified power analysis as the statistical method for analyzing the relationship between the types of statistical tests, the number of variables, the expected effect size, and the sample size recommended. The power of a statistical test of a null hypothesis (H_0) is the probability that the H_0 will be rejected when it is false, that is, the probability of obtaining a statistically significant result (Cohen, 1992). Statistical power is an issue of balance as too much power might produce a statistically significant test but

with litter practical importance. In general, researchers have recommended that most evaluation attempt to achieve a balanced power of 0.80 (Cohen, 1992).

Lipsey and Wilson (1993) stated that in relation to effect size, utilization of information from previous and similar studies undertaken could provide an estimation for the value to be used. In addition, Lipsey and Wilson advised that if there are no effect size available then an assumption of a medium effect size could be made by the researcher. In relation to my study, since no previous studies have been conducted on predicting behavior on betel nut use using the SCT constructs, I selected the medium effect size of 0.15 for calculation. Using G*Power and the parameters of: (1) effect size of 0.15, (2) power of 0.95, (3) alpha level of 0.05, and predictors of 5, the sample size of 138 was identified. This sample number was inflated by 10% for any potential missing data thus yielding an a priori sample size of 152.

Cohen stated that the effect size measures the strength of a statistical phenomenon and quantifies the difference between two different groups or the difference in same group over a period of time. When used in the reference of F test or multiple regression effect size of 0.02 can be used for a small class, 0.15 for medium and 0.35 for large class sizes (Cohen, 1992). Based on a meta-analysis done by Lipsey and Wilson it was found that for behavioral and social science research generally the effects sizes are medium. This effect size was assumed in this research study.

Pilot Study

A pilot study was conducted in a high school in Solomon Island to evaluate the reliability and validity of the self-designed research instrument. The school selected was

in the same geographical location and school district of the intended final study area. A class consisting of 30 students in the age group 16 – 17 years old participated in the pilot study. Apart from the structure and content of the questionnaire, the time duration in answering the questionnaire was also noted. Test-retest of instrument was also administered for stability reliability and where the Cronbach's alpha test to assess internal consistency of each SCT construct was undertaken to ascertain internal reliability. In addition, the Cronbach's alpha test was repeated in the main study as the sample size was low (n=138) in the main study. In relation to the Flesch–Kincaid readability tests, the current research instrument yielded an ease of reading test result of 77.1 with a Flesch-Kincaid grade level 7 comprehension. Results and findings of the pilot study are presented and discussed in Chapter 4 for information.

Procedures for Recruitment, Participation, and Data Collection

Following approval of the health, education and school management authorities, the survey was conducted over a week in the three participating schools. A week before data collection, a consent letter was given to each students for parental approval for student's participation in the survey. Consent forms were retained by school authorities for verification and record. On the day of data collection, the class attendance was first obtained following which, selection of the required number of students was be made whilst noting parental consent and endorsement. Selected students were then placed in a separate classroom for administration of the questionnaire. Since English is a second language to the population, a brief oral presentation and introduction of the questionnaire was undertaken to improve comprehension. Specifically, the questionnaire was read to

the participants to accommodate varying levels of readability and to reduce measurement bias.

Test-retest reliability was conducted as a follow up procedure on the target population. Sharma and Petosa (2014) stated that test-retest reliability, which is also known as stability, is the extent of association between two or more measurements taken over time. Expressed as Pearson coefficient, the stability instrument is repeated to a sample of the same target population after an interval of time (Sharma & Petosa, 2014). In this study, sample of 30 students who are 18 years or older were be invited to pilot test the instrument initially and after an interval of 7 days.

Instrumentation and Operationalization of Constructs

According to Nunnally (1978), constructs are representation of things that do not exist as observable dimension of behavior. In addition, Nunnally stated that the more abstract the construct is, the more difficult it becomes to measure. Furthermore, Stone (1978) discussed that since behavioral research rely heavily on questionnaire formulation as primary tools for data collection, it was crucial that measures on survey instruments adequately represent the constructs under examination. The primary construct of SCT is self-efficacy which is a behavior-specific confidence in one's ability to influence one's habit. Expectations are a function of outcome expectations or anticipatory outcomes of a behavior and outcome expectancies or the value that a person places on a given outcome. Self-control involves setting goals that are proximal and distal and set the course for change. The environment construct was reflected as situations of social and physical supporting the behavior of not chewing betel nut.

The development of and the formulation of the basic structure of the research instruments was made following reviews of similar studies that used the SCT to predict behavior in school students. Established instruments for substance use such as alcohol, tobacco, and hard drugs were also reviewed and the dearth of measurement tools for betel nut use was noted. In the proposed research instrument, key items under the SCT constructs have been adapted from studies predicting behaviors. The proposed research instrument was reviewed by a panel of experts to establish face and content validity.

Operationalization of Variables

Outcome expectation about not chewing betel nut was operationally defined as the anticipated outcome benefits perceived by the high school students from having better health, improved class performance, improved physical endurance, having cleaner teeth, and eating school lunches better. Outcome expectation subscale is a five-item scale measured using five point Likert type scale (0 = Never, 1 = Hardly Ever, 2 = Sometimes, 3 = Almost Always, 4 = Always). The score of outcome expectation was included and analysed with outcome expectancies to provide the overall score for the construct of expectation

Outcome expectancies about not chewing betel nut was operationally defined as the personal value placed on having better health, improved class performance, improved physical endurance, having cleaner teeth, and eating school lunches better by the high school students. Outcome expectation subscale is a five-item scale measured using five point Likert type scale (0 = Not Important, 1 = Slightly Important, 2 = Moderately Important, 3 = Very Important, 4 = Extremely Important), and the ratings was multiplied

and summed. The score of expectation (outcome expectations x outcome expectancies) ranged from 0 to 80 and was a metric score.

Self-efficacy in not chewing betel nut was operationally defined as the confidence of a high school student in finding solutions to stressors and tempting events to betel nut chewing. Self-efficacy subscale was a five item scale measure using five point Likert type scale (0 = Not at All Sure, 1 = Slightly Sure, 2 = Moderately Sure, 3 = Very Sure, 4 = Completely Sure). The score was summed across five situations with the resultant metric score ranging from 0 to 20.

Self-efficacy in overcoming barriers to not chewing betel nut was operationally defined as the ability to adhere to this position when under stress, hunger and influence from family and friends. It was measured through a summative score on a six items Likert type self-reporting rating scale. The subscale: 0 = Not at All Sure, 1 = Slightly Sure, 2 = Moderately Sure, 3 = Very Sure (3), and 4 = Completely Sure, was used. The score was summed across the six situation and the resulting metric score ranged from 0 to 24.

Self-control for not chewing betel nut was operationally defined as the ability of the high school student to setting goals, monitoring progress, and self-reward on successful accomplishment of not chewing betel nut as measured through summative score on a three item Likert type self-reporting rating scale. The subscale: 0 = Not at All Sure, 1 = Slightly Sure, 2 = Moderately Sure, 3 = Very Sure, and 4 = Completely Sure, were used. The score was summed across four situations and the resulting metric score ranged from 0 to 12.

Environment for not chewing betel nut was operationally defined as the social and physical circumstances and conditions that surrounds the high school student. Identified as social support from family and friends on choice not to chew betel nut and policies made at school and community against betel nut availability and distribution as measured through a summative score on a five item Likert type self-reporting rating scale. The scale: 0 = Strongly Disagree, 1 = Disagree Slightly, 2 = Agree Slightly, 3 = Agree, and 4 = Strongly Agree, was used. The score was summed across four situations and the resulting metric score ranged from 0 to 20.

Table 1

Definition, Nature and Coding of Independent and Depended Variables

Variables	Nature of Variable	Operational Definition	Coding	Possible Metric Score
		Independent Variables		
Outcome expectation to not chew betel nut	Metric	Anticipated outcome benefits.	0 = Never, 1 = Hardly Ever, 2 = Sometimes, 3 = Almost Always, 4 = Always.	Range = 0 to 20
Outcome expectancies to not chewing betel nut	Metric	Value placed on behavior	0 = Not Important, 1 = Slightly Important, 2 = Moderately Important, 3 = Very Important, 4 = Extremely Important.	Range = 0 to 80.
Self-efficacy to not chew betel nut	Metric	Confidence in finding alternatives to betel nut.	0 = Not At All Sure, 1 = Slightly Sure, 2 = Moderately Sure, 3 = Very Sure, 4 = Completely Sure.	Range = 0 to 20.
Self-efficacy to overcome barriers	Metric	Adherence to not chew betel nut under pressure.	0 = Not at All Sure, 1 = Slightly Sure, 2 = Moderately Sure, 3 = Very Sure (3), and 4 = Completely Sure.	Range = 0 to 24.
Self-control to not chew betel nut	Metric	Defined as setting goals, monitoring progress, and self-reward.	0 = Not At All Sure, 1 = Slightly Sure, 2 = Moderately Sure, 3 = Very Sure, and 4 = Completely Sure.	Range = 0 to 12.
Environmental factors to not chew betel nut	Metric	Perception on support of environment.	0 = Strongly Disagree, 1 = Disagree Slightly, 2 = Agree Slightly, 3 = Agree, and 4 = Strongly Agree.	Range = 0 to 20.
All SCT constructs Controlling for alcohol and smoking	Metric	SCT on betel nut use	0 = No association, 1 = Association.	Range = 0 or 1
		Depended Variables		
Betel nut use behavior	Binary	Use of betel nut	0 = Non user, 1 = user	Range = 0 or 1

Table 2

Definition, Nature and Coding of Control Variables

Variables	Nature of Variable	Operational Definition	Coding
Alcohol use	Binary	Consumption of alcohol	No = 0, Yes = 1.
Smoking	Binary	Cigarette smoking exposure	No = 0, Yes = 1.

Data Analysis Plan

In this study, the Statistical Package for the Social Science (SPSS) software version 25.0 was used for all data analysis. SPSS is a Windows based program that can be used to perform data entry and analysis. The SPSS Statistical base software is capable of handling large amounts of data and perform a wide range of statistical analysis. In my study, descriptive statistics of cross tabulation and frequencies, bivariate statistics such as t-tests, regression, ANOVA and correlations, are important in data analysis.

Data cleaning was undertaken to ensure data entry are not out of place and inaccurate. Tabchnick and Fidell (2007) identified data cleaning as an important step after the information collected from survey instruments are transferred for data analysis. Data entry is a tedious process and task and where errors can occur. As a first step in data cleaning, I had the SPSS statistical software produce frequency distribution for all relevant variables for identification of possible data entry errors.

The primary research question relates to whether the five SCT constructs (expectations, self-efficacy to refuse betel nut, self-efficacy in overcoming barriers to refuse betel nut, self-control and environment) are associated with chewing betel nut in

high school students. In order to address the primary research question, the following questions and corresponding hypotheses are posited.

RQ1: What is the association of the social cognitive theory construct of expectations to not chew betel nut predict betel nut use in high school students?

H_o1: The social cognitive theory construct of expectations to not chew betel nut is not associated with betel nut use in high school students.

H_a1: The social cognitive theory construct of expectations to not chew betel nut is associated with betel nut use in high school students.

RQ2: What is the association of the social cognitive theory construct of self-efficacy to refuse betel nut chewing predict betel nut use in high school students?

H_o2: The social cognitive theory construct of self-efficacy to refuse betel nut chewing is not associated with betel nut use in high school students.

H_a2: The social cognitive theory construct of self-efficacy to refuse betel nut chewing is associated with betel nut use in high school students.

RQ3: What is the association of the social cognitive theory construct of self-efficacy in overcoming barriers to refuse betel nut chewing predict betel nut use in high school students?

H_o3: The social cognitive theory construct of self-efficacy in overcoming barriers to refuse betel nut chewing is not associated with betel nut use in high school students.

H_a3: The social cognitive theory construct of self-efficacy in overcoming barriers to refuse betel nut chewing is associated with betel nut use in high school students.

RQ4: What is the association of the social cognitive theory construct of self-control to not chew betel nut predict betel nut use in high school students?

H_o4: The social cognitive theory construct of self-control to not to chew betel nut is not associated with betel nut use in high school students.

H_a4: The social cognitive theory construct of self-control to not to chew betel nut is associated with betel nut use in high school students.

RQ5: What is the association of the social cognitive theory constructs of environment predict betel nut use in high school students?

H_o5: The social cognitive theory construct of the environment to not to chew betel nut is not associated with betel nut use in high school students.

H_a5: The social cognitive theory construct of environment to not to chew betel nut is associated with betel nut use in high school students.

RQ6: What is the association between the SCT constructs and betel nut use among high school students when controlling for alcohol use and smoking?

H_o6: There is no association between SCT construct and betel nut use among high school students when controlling for alcohol use and smoking.

H_a6: There is an association between SCT constructs and betel nut use among high school students when controlling for alcohol use and smoking.

Presenting the analysis plan, the instrument's reliability internal consistency was determined with Cronbach alpha. An alpha coefficient that was greater than 0.60 was considered acceptable for item subscales. Confirmatory factor analysis to confirmed one factor solution for each of the components measuring outcome expectations, outcome

expectancies, self-efficacy, self-control and environment for betel nut chewing behavior was undertaken.

The independent and dependent variables were categorised as metric data in the study. As stated both the independent and dependent variables were operationalized as metric based on previous studies conducted using the SCT constructs to predict health behaviour and practices in students. Sharma, Wagner & Wilkerson (2006) used the SCT constructs of expectations, self-efficacy, and self-control to predict the four behaviors against childhood obesity of daily moderately intense physical activity, limiting television viewing, increasing water consumption and increasing fruit and vegetable intake in upper elementary children. Each of the 52 construct items were grouped in a scale from 0 – 4 and later analysed in the SPSS program software.

In data analysis, I first determined outcomes of central tendencies of means and standard deviation of the SCT constructs. Research Questions 1- 5 was assessed using multivariate analysis of the construct model. In RQ 6 regression modeling was used on the covariates of smoking and alcohol as they could have possibly predictive outcome in the study. McNamee (2005) stated that a covariate may be of direct interest and regression modeling offers a way of investigating and correcting joint effects of risk factors. The assessed independent variables were the SCT constructs of expectations / expectancies, self-efficacy, self-efficacy against barriers, self-control, and environment. The dependent variable was not to chew betel nut in secondary school students.

The predictors for betel nut use were alcohol use, smoking, expectations for not chewing betel nut, self-efficacy to not chew betel nut, self-control to not chew betel nut,

and environment situations supporting the choice of not chewing betel nut. Modelling of the predictors of the betel nut chewing behavior was then conducted using stepwise multiple regressions. The *a priori* criteria of probability of F to enter the predictor in the model was selected as less than and equal to 0.05. For discounting and removing a predictor, a value greater than and equal to 0.10 was used.

For hypothesis statistical testing, the *P*-value approach was employed. To conduct the hypothesis test for the population, mean μ, I used the *t*-statistic which follows a *t*-distribution with n - 1 degrees of freedom. I compared the *P*-value to α and if the *P*-value was less than (or equal to) α, I rejected the null hypothesis in favor of the alternative hypothesis. If the *P*-value was greater than α, then I did not reject the null hypothesis.

Table 3

Summary of Research Questions, Variables, and Analysis

Research Question	Construct	Variable Type	Nature of Variable	Analysis
RQ 1	Expectation	Independent	Metric	Multiple Liner Regression
	Betel nut use	Dependent		
RQ 2	Self-efficacy to refuse betel nut	Independent	Metric	Multiple Linear Regression
	Betel nut use	Dependent		
RQ 3	Self-efficacy to overcome barriers	Independent	Metric	Multiple Linear Regression
	Betel nut use	Dependent		
RQ 4	Self-control to not chew betel nut	Independent	Metric	Multiple Liner Regression
	Betel nut use	Dependent		
RQ 5	Environmental factors to not chew betel nut	Independent	Metric	Multiple Linear Regression
	Betel nut use	Dependent		
RQ 6	All SCT construct (controlling for alcohol and smoking)	Independent	Metric	Binary Logistic Regression
	Betel nut use	Dependent		

Threats to Validity

Cook and Campbell (1979) referred to validity as "the best available approximation to the truth or falsity of propositions" (p. 37). In describing internal validity, Gay and Airasian (2000) describe it as "the condition that observed differences on the dependent variable area direct result of the independent variable, not some other variable" (p. 345). Campbell and Stanley (1979) identified the following eight threats to

internal validity: history, maturation, testing, instrumentation, statistical regression, differential selection of participants, mortality, and interaction effects (e.g., selection-maturation interaction). In my study, self-reported instrument would be a threat to internal validity. The use of self-reports is common in health education and promotion research. Recall (response) bias can occur intentionally or unintentionally when participants do not report accurately on activities done or not done. To reduce inaccurate self-reporting, limiting the time period that the subject must recall is one way to reduce such inaccuracy (Cook & Campbell, 1979).

In relation to non-respondents the study utilized a quota convenience sample for theory testing. It was not a survey research study in which non respondents are considered for generalizability. In addition, the purpose of this study was to test the applicability of the theory so a quote sample was justified based on previous such research (Bennett et al., 2018; Cooper et al, 2016).

Separately, Johnson and Christensen (2000) define external validity as "the extent to which the results of a study can be generalized to and across populations, settings, and times" (p. 200). Murray, Smith and Glass (1987) classified threats to external validity into the following three areas: population validity, ecological validity, and external validity of operations. In relation to my study, population and ecological validity would be a threats to external validity. Betel nut use is quite prevalent in Solomon Island communities and out of school adolescents were not considered in the study. Furthermore, adolescents and high school students from other education districts in the country were not included in the study. This particular population subgroup would most

likely have a higher prevalence rate of betel nut use and to whom national health education program against substance use would equally apply. Moreover, if findings can be generalized from one school to another, and from one school district to another school district, then the study possesses ecological validity.

Presenting threats to internal and external validity has at least several advantages. Onwuegbuzie (2000) stated that information about sources of invalidity allows the reader to place the researchers' findings in their proper context. In addition, identifying threats to internal and external validity also helps provide directions for future research where replication studies can be designed to minimize one or more of the stated validity threats. Finally, meta analyses can also be conducted to determine the most prevalent threats to internal and external validity for a given research hypothesis (Onwuegbuzie, 2000).

Threats to construct or statistical conclusion validity were identified and addressed in my study. Kerlinger (1986) stated that construct validity forms the link between theory and psychometric measurement and that validation would be essential for quality measures. Furthermore, the American Psychological Association (APA, 2010) stated that a demonstration of content validity, criterion-related validity, and internal consistency, should be evident in the operational definition of any construct that a measure purports to represent. In my study, low statistical power can be an issue for contemplation. Since no earlier studies could be referenced to in relation to sample size, a medium effect size was selected in the study (Lipsey & Wilson, 1993). According to literature, using a larger sample size could mitigate for a low statistical power. In addition, low reliability of measures can also be a threat to conclusion validity. Cook and

Campbell (1979) advised that the use of internally reliable tests and group means could mitigate for low reliability of measures. In this study, internal reliable tests on the construct was undertaken to minimize issues relating to low reliability of measures.

Ethical Procedures

The researcher is obliged to consider the implications of the proposed research for the participating subjects, their families and society (Burns and Grove 2011). The following ethical issues were considered in the development of this study. Institutional approvals for the conduct of the research was first secured before any contact with the participants is made. As part of the research preparation, Walden University Institutional Review Board (IRB) approval for the conduct of the study as first obtained. Following formal approval by IRB, the Solomon Island Health Research and Ethics Committee was then contacted and provided with a summary research proposal for approval. The Ministry of Education and the selected schools for the research were then consulted for their endorsement of the research conduct. Contacts with the local health and education authorities involved face to face discussions and presentations on the key concepts and questionnaires of the research.

Burns and Grove stated that "researchers have the responsibility to protect of the anonymity of subjects and to maintain the confidentiality of data collected during the study" (p. 172). In this study, the confidentiality and privacy of participant were of utmost importance. The following processes were undertaken to protect participants: (a) students were assigned numbers instead of names for the data collected via the survey instruments, (b) all digital data was kept on a data stick/thumb drive and laptop and

protected by a strong password, (c) all hardcopy data were stored in a locked file cabinet, and (d) names or personal identifying information in any data collected would not be used unless participants provide written informed consent. It was proposed that after five years following the completion of the study, all hard copy and records of the study would be destroyed but with electronic raw data maintained only by the researcher. Knowledge generated from this study would be honestly reported and submitted for publication under standard scientific guideline. All the sources of literature reviewed in this study will be acknowledged in the form of bibliography at the end of the dissertation.

Summary

In this chapter, the quantitative research paradigm underlying the current study was discussed. I outlined the methodological approach used in the study and included discussions about the research design, data collection instrument, and data collection technique. Identification of the study population including procedures for recruitment and power analysis performed to determine sample size were discussed. The study variables and hypotheses were also presented and issues in relation to reliability and validity of the study instrument discussed. At the end of the chapter, matters that are of ethical in nature pertaining to the study were presented.

In chapter 4, I reported on data collected and findings of analysis and displayed demographic findings and reported on the descriptive statistics that characterized the study sample. I also reported on the statistical analysis findings of the study as organized by research questions and hypotheses. Indeed, the statistical findings relate to the analysis

of the SCT of self-efficacy, self-control, expectation, and environment in predicting betel nut use in high school students.

Chapter 4: Results

The purpose of this quantitative cross-sectional study was to investigate the adequacy of the SCT in predicting betel nut chewing behavior in secondary students in the Solomon Islands. The study was conducted to test the association between the five constructs of SCT (expectation [outcome expectations and outcome expectancies], self-efficacy for not chewing betel nut, self-efficacy for overcoming barriers, self-control, and environment) and betel nut chewing behavior. Covariates that are known to influence the dependent variable include gender, ethnicity, alcohol use, smoking, and parental substance use (Lin et al., 2006).

The primary research question addressed whether the five SCT constructs predicted betel nut chewing behaviour in secondary students. The study included both chewers and nonchewers so that a model for predictors of not-chewing behavior could be developed. To answer the primary research question, six research questions were developed:

RQ1: What is the association of the social cognitive theory construct of expectations to not chew betel nut predict betel nut use in high school students?

RQ2: What is the association of the social cognitive theory construct of self-efficacy to refuse betel nut chewing predict betel nut use in high school students?

RQ3: What is the association of the social cognitive theory construct of self-efficacy in overcoming barriers to refuse betel nut chewing predict betel nut use in high school students?

RQ4: What is the association of the social cognitive theory construct of self-control to not chew betel nut predict betel nut use in high school students?

RQ5: What is the association of the social cognitive theory constructs of environment predict betel nut use in high school students?

RQ6: What is the association between the SCT constructs and betel nut use among high school students when controlling for alcohol use and smoking?

In this chapter I describe the pilot study that provided insights into the issues that arose during the final study. Early in the chapter, issues in relation to reliability estimates and construct validity estimates are discussed. I then describe the data collection process. Lastly, I present the results of the study using tables and figures to illustrate the findings.

Pilot Study

A pilot study was conducted in Solomon Island to evaluate the reliability and validity of the research instrument that I initially developed. A high school was selected to participate in the pilot study. The Year 12 class had 53 students of both genders. The first 30 students volunteering in the survey were invited to participate. The pilot survey was later repeated with the same students after an interval of 7 days.

For the pilot study, I examined test-retest reliability and Cronbach's alpha for the internal consistencies. Test-retest reliability, which is also known as stability, is the extent of association between two or more measurements taken over time (Sharma & Petosa, 2014). Expressed as Pearson coefficient in the analysis, the stability was initially tested on 30 students using the SPSS program. SPSS was also used for the test-retest reliability to assess the extent of association of the instrument measurement in the

selected study sample after an interval of 7 days. Due to the low sample size in the main survey (N = 138), I measured Cronbach's alpha to assess internal consistency of the SCT constructs in the main study. The Cronbach's alpha was measured to determine the internal consistency for the five subscales used in this pilot study and findings are as follow. The scales were outcome expectations to not chew betel nut (Cronbach's alpha = 0.695), outcome expectancies to not chew betel nut (Cronbach's alpha = 0.639), self-efficacy for not chewing betel nut (Cronbach's alpha = 0.796), self-efficacy in overcoming barriers while choosing not to chew betel nut (Cronbach's alpha = 0.662), self-control to not chew betel nut (Cronbach's alpha = 0.825), and environment aiding in not chewing betel nut (Cronbach's alpha = 0.673). For the entire scale, the Cronbach's alpha was 0.715.

In the analysis of test-retest reliability, the variables of outcome expectations and self-efficacy to overcome barriers reflected coefficient values of 0.829 and 0.813, respectively. The other variables of outcome expectancy, self-efficiency, self-control, and environment factors showed coefficient values of 0.70, 0.710, 0.733, and 0.718, respectively. For Pearson coefficient value, Nunnally and Bernstein (as cited in Sharma & Petosa, 2014) "recommend a value of 0.70 as acceptable, 0.80 as better, and 0.90 as excellent" (p. 113). A lower value of test-retest reliability coefficient is possible and could be related to either "changes in the underlying concepts or reactivity that refers to changes due to the very process of measuring a phenomenon" (Carmines & Zeller, as cited in Sharma & Petosa, 2014, p. 113). The test-retest reliability coefficient of betel nut chewing behavior instrument in the pilot study is displayed in Table 4.

Table 4

Test-Retest Reliability Coefficient of Betel Nut Chewing Behavior Instrument

Subscale	Test-retest reliability coefficient
Outcome expectation	0.829
Outcome expectancy	0.70
Self-efficacy	0.710
Self-efficacy to overcome barriers	0.813
Self-control	0.733
Environment factors	0.718

From the result of the pilot study, I determined that there was no justifiable requirement for changes to the research instrument or the data analysis strategies. The questionnaire was easy to understand as the research instrument yielded an ease of reading test result of 77.1 with a Flesch-Kincaid Grade Level 7 comprehension. In addition, students took an average time of 30 minutes to complete the questionnaire, which was determined to be a favourable amount for classroom-based research. This time for completion was also observed in the main study.

Data Collection

After receiving IRB approval (# 08-16-18-0263794) for data collection, I submitted a formal application to conduct local health research to the Solomon Island Ministry of Health and Medical Services research unit. The research unit performs the role as secretary to the Solomon Island Health Research and Ethics Review Board, which is the vetting body for all health research conducted in the country. Research approval

from Solomon Island Health Research and Ethics Review Board was received in September 2018, after which the required research ground work was initiated with assistance from the research counterpart of the Solomon Island Ministry of Health and Medical Services. Letters were sent to the selected schools inviting them to participate in the survey. The selected schools readily agreed to participate, so I made direct consultations to inform them of the research process. Consent forms for all volunteering students were completed, and parental consent was obtained for all students below 18 years of age.

Data collection was undertaken over a period of 3 weeks in September, 2019. Data collection steps outlined in Chapter 3 and in the IRB approved processes were adhered to. A random selection process of 4 secondary schools in the selected district was made with one school identified specifically for the pilot surveys.

For the survey a quota sampling technique to select the study participants was used. The school district is the largest in the country with >70% of senior secondary school located within the district. In relation to the proportionality to the larger population, the school district accounts has 18 or 70% of the total number of senior secondary schools in the country. A quota sampling technique which is a non-probability sampling method was used in the study. This sampling method was useful for theory testing as my research was not a survey where non respondents would be considered for generalizability (Bennet et al., 2018).

The survey finding showed that 96% of students in the study population were 18 years of age or older. This was a revelation to the researcher as it was envisioned that a

younger age group of around 16 - 17 year of age would be in Year 12 of senior secondary schools as reported by the Solomon Island Ministry of Education and Human Resource Development (MEHRD, 2017). The gender distribution ratio of Year 12 students in the study population was male 41.9% and female 57.1%. Nationally, the overall percentages of gender distribution of senior secondary school students (Years 10, 11, 12, and 13) were at 52% and 48% for males and females respectively (MEHRD, 2017). In relation to provincial origins of the study participants, it was noted in the study that most participants identified their family origins as from other neighbouring island provinces such as Malaita (37.1%) and Western (18.6%). Honiara and the participating school are in the island of Guadalcanal and 13.6% of the study population were identified with the province.

Results

Statistics Analytic Tools

The Statistical Package for Social Sciences (SPSS) version 25 on Windows 10 was used for the analysis of data collected during the survey. Generated analysis included descriptive statistics, cross tabulation on certain demographic and social characteristics, and multiple regression and multiple logistic regression analysis on the six hypothetical research questions of the study. Additionally, the SPSS Amos version 25 was utilized for confirmatory factor analysis to determine whether the number of factors and the loadings of measured variables conform to what was expected on the basis of theory.

Noting that multi regression analysis was used in the analysis, the characteristics of data entered in relation to the assumptions for stepwise regression was determined.

The assumptions included sample size, collinearity diagnostics, outliers, correlation and linear association between predictor and outcome variables. The correlation table showed that none of the predictor variables are multi-collinear to each other as none of the variables showed a value >0.7. In relation to the predictor variables of the SCT constructs correlation to the outcome variable of betel nut chewing, none of the variable had a value >0.3 and all showed a negative correction and not a linear association. The sample size was adequate as the study population number of 138 was well above the minimum of 100 recommended for regression with 5 predictor variables. Indeed, Schmidt (1971) proposed that a sample size of 20 per independent variable was adequate for regression analysis. This number was satisfied for the regression from the study population number.

Face and Content Validity of Instrument

Sharma and Petosa (2014) affirmed that face validity was a basic type of validity that an instrument can hold and was a prerequisite for other validity types and assessments. In this research, face validity was obtained through a panel of three experts on the SCT. Noting that SCT has never being tested on betel nut use behavior, the same panel of experts was also invited to assess content validity of the instrument. Sharma and Petosa (2014) explained that content validity "measures whether the items adequately assess each construct within the universe of content as operationally defined" (p. 80). The experts that assessed my study instrument confirmed the readability, relevance and clarity of items hence asserting face and content validity of the SCT subscales.

Construct Validity of Instrument

Construct validity was one of the four types of instrument validity assessments where determination of how well the items in a given instrument measure the same construct and are related to each other was made (Sharma & Petosa, 2014). Construct validity was very important for instruments measuring a construct from theory. As discussed above my study construct structure was developed in consultation with three experts apart from guidance from my research committee members.

In order to ascertain statistically confirmatory factor analysis (CFA) was conducted to confirm factors for the SCT constructs in relation to betel nut use behavior. Maximum likelihood method was carried out to estimate factor loading of each construct. The *a* priori level was an Eigenvalue greater than 1.0 and factor loadings of each item greater than 0.44. The subscales measuring outcome expectations, outcome expectancies, self-efficacy, self-efficacy in overcoming barriers, self-control, and environment satisfied all criteria and confirmed one factor solutions. Figure 1 show the result of the CFA and generally the factor loading ranged from 0.54 to 0.90.

In addition, and to determine goodness of fit or whether the model was a good model, three model fit indices in SPSS Amos version 25 were analyzed. The selected indices included goodness of fit chi-square, comparative fit index (CFI), and root mean square error of approximation (RMSEA). Sharma and Petosa (2014) stated that a *p*-value of greater than 0.05, CFI of 0.95 or larger, and a RMSEA of less than 0.05 are indicative of a good fit. In my analysis the following results of good of fit indices as outcomes of the study was ascertained. The *p* value of <0.05, CFI of 0.77, and RMSEA of 0.102 all

point to a poor fit model. The poor fit model indicated a significant discrepancy between the correlation proposed and the correlation observed in the study.

Reliability of SCT Instrument

For reliability, Cronbach's alphas were calculated to measure the internal consistency for the five subscales used in this study. The scales were 1- outcome expectations to not chew betel nut (Cronbach's alpha = 0.83), 2- outcome expectancies to not chew betel nut (Cronbach's alpha = 0.76), 3- self-efficacy for not chewing betel nut (Cronbach's alpha = 0.85), 4- self-efficacy in overcoming barriers whilst choosing not to chew betel nut (Cronbach's alpha = 0.88), 5- self-control to not chew betel nut (Cronbach's alpha = 0.80), and 6- environment factors aiding in not chewing betel nut (Cronbach's alpha = 0.84). Collectively for the entire scale, the Cronbach's alpha was 0.83.

Sharma and Petosa (2014) stated that α coefficients that were less than 0.5 were usually unacceptable and purported to be unidimensional. Coefficients between 0.65 and 0.8 for whole scale and subscales are viewed by many methodologists as the minimum acceptable value. In the study all of the subscales were determined to be reliable with a value above 0.70. For inter item correlation, all items had positive inter correlation with the lowest noted for outcome expectancy at 0.27 and highest for environment factors at 0.78.

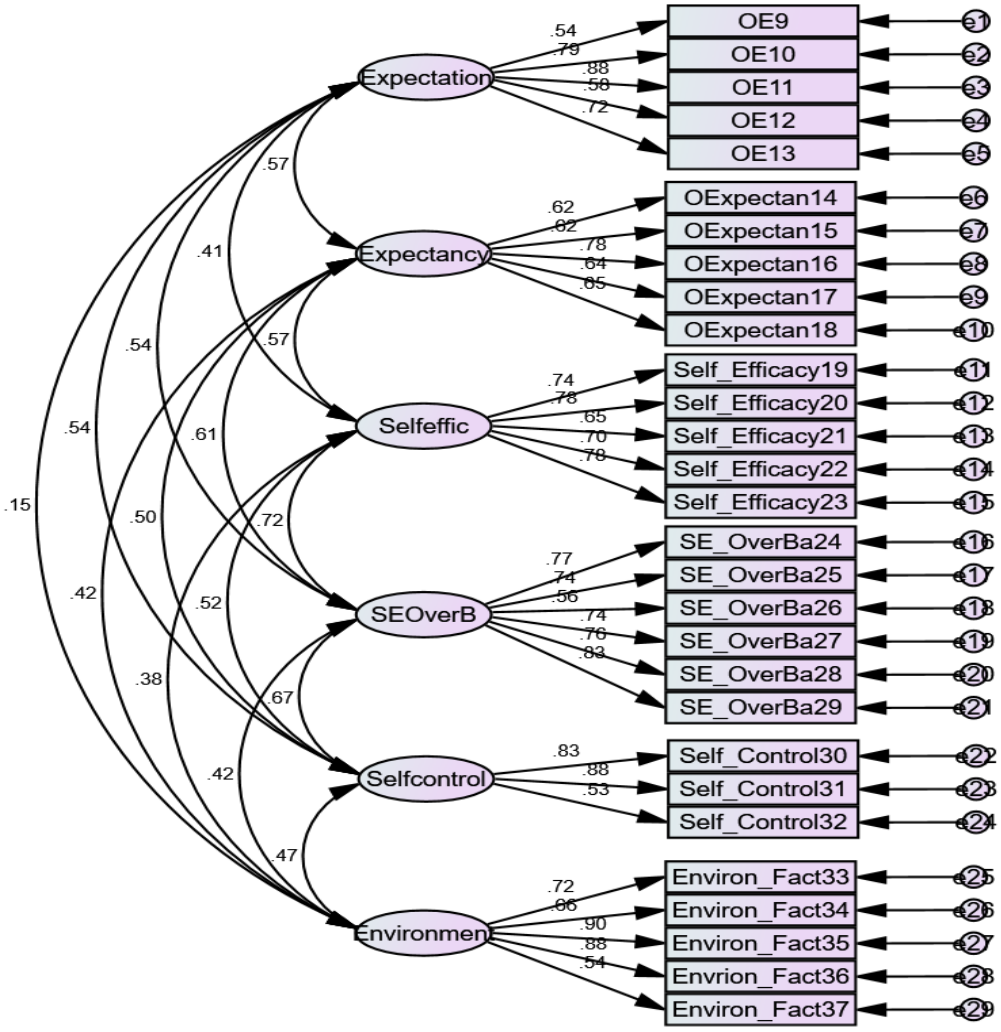

Figure 2. Confirmatory factor analysis (CFA) for betel nut chewing model.

Descriptive Characteristics of Study Population

A total number of 154 of students from 3 secondary schools participated in the survey and from which the final sample number of 138 was selected. Key demographic and social characteristics of the sample population are displayed in Table 1 and Table 2 for information. In Table 1, some descriptive information on frequencies of the gender, age, provinces of identification and religious beliefs identification are provided. In Table 2, certain behavioral characteristics of the study population such as betel nut use, alcohol, and smoking use behavior are explained.

The gender distribution of the final participants was 62 (44.9%) male and 76 (55.1%) female participants. The age of participating students ranged between 17-23 years and the mean age of 18.9 years. The frequency distribution of the participants' age group revealed the following percentages, 17 years = 4%, 18 years = 37%, 19 years = 56%, 20 years = 29%, 21 years = 6%, 22 years = 4%, and 23 years = 2%.

In the research questionnaire the history of betel nut use was obtained in 5 subscales 'never chewed', 'chewed once or twice in the past', 'current user once a month', 'current user at least once per week' and, 'current user daily or every other day'. Of the subscales of betel nut users, 'chewed once or twice in the past' received the highest response figure at 29%. Daily user of betel nut was reported by 31 (22.5%) of the participants. For logistic regression this variable was changed to a dichotomy response with 'Yes' or 'No' and with 27.5% responded to no past use and 77.5% as having use betel nut.

Table 5

*Demographic Characteristics of Study Participants (*N *=138)*

Total Population (*n*=138)		Frequency (*n*)	Percentage – Actual *(%)*	Percentage – Cumulative *(%)*
Sex	Male	62	44.9	44.9
	Female	76	55.1	100
Age	17 years	6	4.3	4.3
	18 years	41	29.7	34.1
	19 years	55	39.9	73.9
	20 years	30	21.7	95.7
	21 years	5	3.6	993
	22 years	1	0.7	100
Province	Central	7	5.1	5.1
	Western	30	21.7	26.8
	Guadalcanal	28	20.3	47.1
	Malaita	38	27.5	74.6
	Choiseul	14	10.1	84.8
	Temotu	4	2.9	87.7
	Renbel	5	3.6	91.3
	Makira Ulawa	3	2.2	93.5
	Isabela	9	6.5	100
Religion	Christian	133	96.4	96.4
	Muslim	1	0.7	97.1
	Buddhist	1	0.7	97.8
	Other	3	2.2	100

The largest number of students enrolled in schools in the study identified themselves as having provincial origin outside of Guadalcanal Province where the study school district was located. A total of 38 (27.5%) students originated from the neighboring island of Malaita, 30 (21.7%) from the Western Province, and 28 (20.3%) from the home province of Guadalcanal. Separately, the predominant religion of the study population was Christianity with 133 (96.4%) of the student identified with the faith.

Table 6

*Substance Use and Behavioral Characteristics of Study Population (*N *=138)*

Total Population (*n*=138)	Frequency (*n*)	Percentage – Actual *(%)*	Percentage – Cumulative *(%)*
Have you ever attended a betel nut awareness programme?			
None	76	55.1	55.1
Once	3.3	23.9	79
Twice	8	5.8	84.8
Three times	1	0.7	85.5
More than three times	20	14.5	100
Have you ever chewed betel nut?			
Never chewed	38	27.5	27.5
Once or twice	40	29	56.5
Current user once a month	9	6.5	63
Current user at least weekly	20	14.5	77.5
Current user daily	31	22.5	100
Do you current smoke?			
No	125	90.6	90.6
Yes	13	9.4	100
Do you currently drink?			
No	166	84.1	84.1
Yes	22	15.9	100

Health education and health promotion against betel nut use was an important strategy against its use. In the study population, 76 (55.1%) of students reported not having had any exposure to health education or health awareness sessions against betel nut use. For exposure or having ever chewed betel nut, 38 (27.5%) of student reported not having chewed betel nut. The total number of all students with some exposure and experience of having chewed the nut was 100 (72.5%) and 31 (22.5%) were daily users of the fruit.

For alcohol use, only 22 (15.9%) students report having used alcohol. Separately for tobacco use 13 (9.4%) reported as current smokers. From the demographic and social characteristics, cross-tabulation analysis was undertaken to ascertain the association between betel nut chewing and tobacco use. The results of these cross-tabulation are presented in Table 11 the result section of the chapter.

Table 7

*Summary Table of SCT Constructs (*N *=138)*

Constructs	Possible Ranges	Observed Ranges	Mean (SD)	Cronbach alpha
Expectations	0 – 80	0 – 80	62.3 (16.8)	0.86
Self-efficacy	0 – 20	0 – 20	15.8 (5.0)	0.87
Self-efficacy to overcome barriers	0 – 24	0 – 24	19.1 (5.6)	0.88
Self-control	0 – 12	0 – 12	10.4 (2.7)	0.86
Environment	0 – 20	0 – 20	16.4 (4.8)	0.87

The construct table showed the collective summary of participants' response to the SCT construct. Participants' responses cover all the possible ranges of the scores. All participants scored above the middle of the range and the standard deviation reflect the number of questions in the subscale. Responses to self-control are at the top of the range (10.4 units) whilst the constructs of self-efficacy not to chew betel (15.8 units) nut and self-control to overcome barriers (19.1 units) were closer to the middle of the range. Tables 5-10 summarizes additional participants' responses to other key questions in the research instrument.

Table 8

*Summary of Responses to SCT Construct of Outcome Expectations (*N*=138)*

	Never	Hardly Ever	Sometimes	Almost Always	Always
9. If you do not chew betel nut, you will have better health.	2 (1.4)	0 (0)	16 (11.6)	21 (15.2)	99 (71.7)
10. If you do not chew betel nut your class performance will improve.	3 (2.2)	0 (0)	24 (17.4)	20 (14.5)	91 (65.9)
11. If you do not chew betel you will have more time for physical activities.	4 (2.9)	3 (2.2)	16 (11.6)	24 (17.4)	91 (65.9)
12. If you do not chew betel nut, you will have cleaner teeth.	3 (2.2)	0 (0)	4 (2.9)	16 (4.6)	115 (83.3)
13. If you do not chew betel nut, you will eat school lunches better.	7 (5.1)	0 (0)	21 (15.2)	19 (13.8)	91 (65.9)

Table 9

*Summary of Responses to SCT Construct of Outcome Expectancies (*N *=138)*

	Not important	Slightly important	Moderately important	Very important	Extremely important
14. Being healthy.	1 (0.7)	0 (0)	4 (2.9)	41 (21.7)	92 (66.7)
15. Improving your class performance.	2 (1.4)	2 (1.4)	6 (4.3)	49 (35.5)	79 (57.2)
16. Having more time for physical activities.	2 (1.4)	2 (1.4)	12 (12.3)	39 (28.3)	78 (56.5)
17. Having cleaner teeth.	2 (1.4)	0 (0)	2 (1.4)	58 (27.5)	96 (69.6)
18. Eating school lunches better.	5 (3.6)	5 (3.3)	12 (8.7)	40 (29)	76 (55.1)

Table 10

*Summary of Responses to SCT Construct of Self-Efficacy (*N*=138)*

	Not at all sure	Slightly sure	Moderately sure	Very sure	Completely sure
19. If coerced forced to chew betel nut, you have confidence in your ability to oppose.	12 (8.7)	2 (2.2)	12 (8.7)	34 (24.6)	7.7 (55.8)
20. You could deal efficiently with tempting events and not chew betel nut.	12 (8.7)	5.5 (3.6)	12 (8.7)	33 (23.9)	76 (55.1)
21. When encountering study stressors, you can usually find several solutions to address them instead of chewing betel nut.	9 (6.5)	5 (3.6)	9 (6.5)	30 (21.7)	85 (61.6)
22. Passing by the betel nut stand and not be tempted to buy it.	11 (8)	8 (5.8)	12 (8.7)	21 (15.2)	86 (62.3)
23. Being with others who chew the betel nut and not chewing it yourself.	11 (8)	4 (2.9)	12 (15.9)	31 (22.5)	70 (50.7)

Table 11

*Summary of Responses to SCT Construct of Self-Efficacy to Overcome Barrier (*N*=138)*

	Not at all sure	Slightly sure	Moderately sure	Very sure	Completely sure
24. You can refuse to chew betel nut even if your close friends chew the nut in front of you.	8 (5.8)	6 (4.3)	13 (9.4)	30 (21.7)	81 (58.7)
25. You can refuse to chew betel nut even if your parents chew the nut at home.	9 (6.5)	9 (6.5)	13 (9.4)	28 (20.3)	79 (57.2)
26. You can refuse to chew betel nut even if it is readily accessible to you.	8 (5.8)	11 (8)	12 (8.7)	35 (25.4)	72 (52.2)
27. You can refuse to chew betel nut even if your family sells betel nut.	8 (5.8)	8 (5.8)	17 (12.3)	33 (23.9)	72 (52.2)
28. You can refuse to chew betel nut even if you are under a lot of stress.	7 (5.1)	3 (2.2)	14 (10.1)	29 (21)	85 (61.6)
29. You can refuse to chew betel nut even if it you are really hungry.	10 (7.2)	6 (4.3)	8 (5.8)	22 (15.9)	92 (66.7)

Table 12

*Summary of Responses to SCT Construct of Self-Control (*N=*138)*

	Not at all sure	Slightly sure	Moderately sure	Very sure	Completely sure
30. You are able to set goals towards not chewing betel nut.	6 (4.3)	5 (3.6)	5 (3.6)	23 (16.7)	99 (71.7)
31. You can keep track of your progress toward not chewing betel nut.	5 (3.6)	3 (2.2)	7 (5.1)	28 (20.3)	95 (68.8)
32. You can reward yourself for progress toward the goal of not chewing betel nut.	5 (3.6)	8 (5.8)	6 (4.3)	40 (15.2)	98 (71)

Table 13

*Summary of Responses to SCT Construct of Environment Factors (*N*=138)*

	Strongly disagree	Disagree slightly	Agree slightly	Agree	Strongly agree
33. That betel nut be not available at home.	11 (8)	4 (2.9)	19 (13.8)	30 (21.7)	74 (53.6)
34. That betel nut not be available around school.	9 (6.5)	6 (4.3)	9 (6.5)	18 (13)	96 (69.6)
35. That you have support for choosing not to chew betel nut.	6 (4.3)	6 (4.3)	6 (4.3)	35 (25.4)	85 (61.6)
36. That school policies prohibit betel nut chewing.	7 (5.1)	3 (2.2)	3 (2.2)	22 (15.9)	103 (74.6)
37. Betel nut sales are restricted in your village/town.	13 (9.4)	10 (7.2)	9 (6.5)	26 (18.8)	80 (58)

Table 14

*Cross-Tabulation of Betel Nut Chewing by Smoking (*N*=138)*

			Smoke		
			No	Yes	Total
Betel Nut (No /Yes)	No	Count	44	0	44
		% within betel nut	100.0%	0.0%	100.0%
		% within smoke	34.6%	0.0%	31.9%
	Yes	Count	83	11	94
		% within betel nut	88.3%	11.7%	100.0%
		% within smoke	65.4%	100.0%	68.1%
Total		Count	127	11	138
		% within betel nut	92.0%	8.0%	100.0%
		% within smoke	100.0%	100.0%	100.0%

Note. $p = 0.018$ < less than level of significance (0.05).

Compared to non-smokers (92%) smokers are significantly more likely to chew betel nut (8%).

Multivariate Analysis of Research Question and Hypothesis

The main focus of this study was to investigate the adequacy of the SCT construct to predict not chewing betel nut in high school students in Honiara, Solomon Islands. Six research questions were formulated to determine if there was association between the SCT constructs as a model (independent variables) and the students' response to not chew betel nut (dependent variable). RQ 1, 2, 3, 4 and 5 were analyzed using multivariate analysis of construct model and RQ 6 was analyzed through binary logistic regression. For multiple linear regression the *a* priori criteria of probability of F to enter the predictor in the model was chosen as less than and equal to 0.05 and for removing the predictor as greater than and equal to 0.10. Table 15 displayed the findings of the multiple regression analysis.

Table 15

*Parameter Estimates From the Final Multiple Regression Model for Betel Nut Chewing as Predicted by Social Cognitive Theory Constructs and Covariates (*N = *138)*

Model		Unstandardized Coefficients		Standardized Coefficients			95.0% Confidence Interval for B	
		B	Std. Error	Beta	T	Sig.	L/Bound	U/Bound
1	(Constant)	1.191	.210		5.670	.000	.775	1.606
	Smoke	.288	.208	.167	1.384	.169	-.124	.699
	Alcohol	.001	.172	.001	.006	.995	-.338	.340
	Expectation	.000	.002	.015	.144	.886	-.005	.005
	Self-efficacy	-.008	.010	-.089	-.811	.419	-.028	.012
	SE Over Barriers	-.020	.009	-.256	-2.289	.024	-.038	-.003
	Self-control	-.026	.023	-.127	-1.143	.255	-.071	.019
	Environment	.013	.010	.124	1.298	.197	-.007	.033

Note. a. Dependent Variable: Betel_Nut_No_Yes
F (7, 130) = 3.685, p=.001, R^2 = 0.166. Dependent variable was not chewing betel nut (yes/no); B = unstandardized coefficient; Std. Error = standard error of coefficient; Beta = standardized coefficient; P-value = level of significance.

RQ1: What is the association of the social cognitive theory construct of expectations to not chew betel nut predict betel nut use in high school students?

H_o1: The social cognitive theory construct of expectations to not chew betel nut is not associated with betel nut use in high school students.

H_a1: The social cognitive theory construct of expectations to not chew betel nut is associated with betel nut use in high school students.

There was a non-significant ($p = 0.886$) association between expectations (outcome expectation and outcome expectancies) and not chewing betel nut. The significance of this finding justified the acceptance of the null hypothesis that states of no association between expectations and not chewing betel nut.

RQ2: What is the association of the social cognitive theory construct of self-efficacy to refuse betel nut chewing predict betel nut use in high school students?

H_o2: The social cognitive theory construct of self-efficacy to refuse betel nut chewing is not associated with betel nut use in high school students.

H_a2: The social cognitive theory construct of self-efficacy to refuse betel nut chewing is associated with betel nut use in high school students.

Self-efficacy showed a non-significant ($p = 0.419$) association between self-efficacy not to chew betel nut and betel nut chewing. This finding justified the acceptance of the null hypothesis that states no association between self-efficacy and not chewing betel nut.

RQ3: What is the association of the social cognitive theory construct of self-efficacy in overcoming barriers to refuse betel nut chewing predict betel nut use in high school students?

H_o3: The social cognitive theory construct of self-efficacy in overcoming barriers to refuse betel nut chewing is not associated with betel nut use in high school students.

H_a3: The social cognitive theory construct of self-efficacy in overcoming barriers to refuse betel nut chewing is associated with betel nut use in high school students.

Self-efficacy to overcome barriers unique to itself explained a significant variance to betel nut chewing behavior. Taken as a set, only self-efficacy to overcome barrier (p <.05) was significantly related to intent for not chewing betel nut. Self-efficacy to overcome barriers along with other SCT constructs explained 17% (Adjusted R^2= 0.166) of the betel nut chewing behavior. In addition, there was a significant (p<.05) association between self-efficacy to overcome barriers to not chew betel nut and betel nut chewing. A unit increase in self-efficacy to overcome barriers resulted in a -0.26 decrease in betel nut use behavior. This finding showed an association of self-efficacy and betel nut chewing and justified the rejection of the null hypothesis that states of no association and the acceptance of the alternate hypothesis. Data from individual SCT construct was then compiled to answer the six research questions as outlined below.

RQ4: What is the association of the social cognitive theory construct of self-control to not chew betel nut predict betel nut use in high school students?

H_o4: The social cognitive theory construct of self-control to not to chew betel nut is not associated with betel nut use in high school students.

H_a4: The social cognitive theory construct of self-control to not to chew betel nut is associated with betel nut use in high school students.

There was a non-significant (p = 0.255) association between self-control and not chewing betel nut. The significance of this finding justified the acceptance of the null hypothesis that states of no association between the SCT construct of self-control and betel nut chewing behavior.

RQ5: What is the association of the social cognitive theory constructs of environment predict betel nut use in high school students?

H_o5: The social cognitive theory construct of the environment to not to chew betel nut is not associated with betel nut use in high school students.

H_a5: The social cognitive theory construct of environment to not to chew betel nut is associated with betel nut use in high school students.

Environment factors reflected a non-significant ($p = 0.197$) association with not chewing betel nut. The significance of this finding justified the acceptance of the null hypothesis that states of no association between environment factors and not chewing betel nut.

RQ6: What is the association between the SCT constructs and betel nut use among high school students when controlling for alcohol use and smoking?

H_o6: There is no association between SCT construct and betel nut use among high school students when controlling for alcohol use and smoking.

H_a6: There is an association between SCT constructs and betel nut use among high school students when controlling for alcohol use and smoking.

For this hypothesis, the binary logistic regression analytic tool was used to assess the association of the SCT constructs on betel nut use controlling for the covariates of alcohol and smoking on betel nut use. The covariates of alcohol and smoking were included in block 1 and all the SCT constructs were included in block 2 in the SPSS program analysis.

Table 16

*Binary Logistic Regression for Betel Nut Use as Predicted by the SCT Constructs and Controlling for Covariates of Smoking and Alcohol Use (*N=*138)*

							95% C.I.for EXP(B)	
		B	S.E.	Wald	df	Sig.	Exp(B)	Lower	Upper
Step 1[a]	Smoke	20.494	11002.583	.000	1	.999	794850294.	.000	.110.
	Alcohol	-.339	.986	.118	1	.731	.713	.103	4.919
	Expectation	.008	.014	.329	1	.566	1.008	.981	1.037
	Self-efficacy	-.054	.059	.839	1	.360	.947	.844	1.063
	SE Over/Barriers	-.144	.062	5.374	1	.020	.866	.766	.978
	Self-control	-.244	.172	2.018	1	.155	.783	.559	1.097
	Environment	.061	.061	.987	1	.320	1.063	.942	1.199
	Constant	5.527	1.768	9.771	1	.002	251.417		

a. Variable(s) entered on step 1: SumOut_Expec, SumSelf_Eff, SumOverBa, SumSelf_Control, SumEnviron_Fact.

In Block 1, the covariates both reflected a non-significant results. For block 2, the test of significance generated the following results; χ^2 (5, n=138) = 21.56, $p < 0.001$. The model as a whole explained between 20% (Cox and Snell *R* square) and 28% (Nagelkerke R squared) of the variance and also can correctly predict 74.6% of betel nut chewing. The Hosmer and Lemeshow chi-square was non-significant ($p > 0.10$) that indicated a good fit of the model.

The results of the logistic regression contained in Table 16, shows only self-efficacy to overcome barriers made a significant contribution to the model with an odd ratio of 1.15 for every unit increase in students that use betel nut. Overall, it is assumed that the covariates of alcohol and smoking do not have any significant influence in the ability of the independent variables, when taken as set, to predict betel nut use in high

school students. The significance of this finding justified the rejection of the null hypothesis which stated of no association between the SCT and betel nut use when controlling for covariates of alcohol and smoking.

Summary

In this chapter the processes and procedures to the data collection methods of the study and presented the key results and findings to the research questions of the study are outlined. The study investigated the adequacy of SCT constructs of expectation, self-efficacy, self-efficacy to overcome barriers, self-control, and environmental factors to predict not chewing betel nut in high school students in Honiara, Solomon Islands. To address the six research questions a statistically derived convenient quota sample of 138 Year 12 students who were mostly 19 years old in the Honiara school district in Solomon Islands was employed. Data was collected through a self-administered questionnaire. For data analysis the SPSS version 25 was used. The SPSS measured and analyzed the constructs reliability as well as evaluation the type and extent of association between each of the dependent variables of SCT constructs and covariates, and the dependent variable of not to chew betel nut. To assess the theoretical model of the research instrument, confirmatory factor analysis was conducted through SPSS Amos version 25.

On cross tabulation only 11 students (7.9%) of betel nut users also reported using tobacco products specifically smoking. Under the chi-square test, the cross tabulation of betel nut users who are also tobacco users was significant ($p<.01$). In addition, initial multiple linear regression of the five SCT constructs in RQ1 showed that only self-efficacy to overcome barrier ($p<.05$) was the only significant independent predictor of not

chewing betel nut behavior among high school students. Furthermore, when considering and controlling for the effects of covariates of smoking and alcohol, the SCT constructs as a model, was a significant predictor of not chewing betel nut in high school students (<.01). A more detail report on the findings and recommendations of the study is be presented in Chapter 5.

Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this quantitative study was to examine whether the constructs of SCT (expectations, self-efficacy, self-control, and environment) predicted and explained betel nut use in secondary students in the Solomon Islands. Dai and Sharma (2014) used the SCT constructs to predict four modifiable risk behaviors of obesity development, and concluded that SCT could be used to guide the formulation of preventive programs. There have been no documented studies conducted on the use of SCT in predicting betel nut chewing behavior, but studies had included the theory in the examination of tobacco and alcohol behaviors.

This study addressed the modifiable behavioral factors that could be targeted by the Ministry of Health for intervention efforts. The SCT constructs of expectation, self-efficacy, self-efficacy to overcome barriers, self-control, and environment were the independent variables used to predict the dependent variable of not to chew betel nut in secondary students in the Solomon Islands. Covariates that are known to influence the dependent variable include gender, ethnicity, alcohol use, smoking, and parental substance use. However, only alcohol and smoking were included in the study analysis.

The principle finding from this study was that one construct from the SCT was weakly predictive of the intent among secondary students to not chew betel nut. Self-efficacy to overcome barriers ($p < .01$) was the only construct that significantly predicted intent for not chewing betel nut.

Interpretation of the Findings

The study was conducted in the Solomon Island. The country with a population of around 617,000 has 70 distinct languages unique to the islands and provinces. English is spoken by only 2% of the population but is the language of instruction in schools. An English-based creole version of Pidgin English is used as the language of communication among the population groups. The survey was conducted in English and all attempts were made to ensure adequate comprehension of the survey questions by study participants.

Age and Gender

Findings indicated that students in Year 12 were much older than the anticipated age group of 16 to 18 years. More than 65% of the students were 19 years old or older. The most likely explanations for the older age group in Year 12 was that students started late in Year 1 or that students repeated classes and years along the way. The slightly older age group had some impact on the administration of the study especially in relation to informed consent processes. The gender distribution in the study population was 0.83:1 male to female. In the general population, the male to female ratio in 2015 was 1.03:1. The study population ratio would be worthwhile to reflect on in future studies as more males than females tend to chew betel nut in the country (see Quinn et al., 2017).

With the mean age of 19 years, getting parental consent for survey participation was not time-consuming. However, having an older group of participants could have meant that use of betel nut was well established in these students. Students reporting daily use of betel nut chewing were 22.5% of the study sample. Guo et al. (2013) reported that betel nut use initiation in Taiwan occurred as early as 13 years of age.

Similarly, Tovosia et al. (2007) reported that betel quid chewing start as early as 13.2 years of age in men and 14.7 years of age in women in the Solomon Island. The impact of these findings on the SCT constructs will need further analysis to determine whether the current study findings would yield a different result in a younger age group around the age of betel nut chewing behavior initiation.

Betel Nut Chewing Prevalence

Having up-to-date information on the current prevalence of betel nut chewing in young people, especially in schools, is important for health education and health-promotion efforts by national authorities. For Solomon Island, the most recent study indicated a prevalence rate of 88% (90% males and 84% females) betel nut chewers in the 15-24 years age group (Quinn et al., 2017). In the current study, reported use of betel nut chewing (previous and current users) was 68% (59.3% males and 74.7% females). The age range of the study participants (17-22 years) fell within the age group of the Quinn et al. study but the latter included both out-of-school youths (59%) and high school students (41%). A gender difference in the two studies may be significant to note. The finding of a slightly lower betel nut chewing prevalence among males in the current study would be worth exploring as environmental factors could be at play.

Expectations to Chewing Betel Nut

Expectations were found to be not significant for predicting betel nut chewing in the study ($p = 0.866$). Outcome expectation is linked to outcome expectancy as the former is about the expected costs and benefits for different health habits while the latter describes the value placed on the desired outcome following a behavior or action

(Bandura, 2004; Sharma & Romas, 2012). Lowenstein et al. (2013) stated that outcome expectation has a positive association with self-efficacy, and some studies have demonstrated the theoretical and clinical utility of applying both SCT constructs.

Connor et al. (2014) examined the association between refusal self-efficacy and outcome expectancies in a sample of cannabis users in an alcohol and drug outpatient clinic. Connor et al. found that refusal self-efficacy mediates part of the association between cannabis outcome expectancies and cannabis use. In my study, both constructs were found to be not significant in predicting betel nut chewing behavior in secondary students.

Outcome expectation is important in making decisions regarding engaging in a behavior or action and could be improved upon through education (Bandura, 2011; Sharma & Romas, 2012). An increase in expectations increases the likelihood of acquiring the desired behavior. The MTM of health behavior change proposed the construct of participatory dialogue, which suggests that advantages of a behavior change must outweigh disadvantages of the behavior change (Sharma, 2015). Expectations can be examined in future studies by employing the MTM construct of participatory dialogue in which the health educator can have a two-way session with the students regarding the benefits of behavioral change.

Self-Efficacy to Chewing Betel Nut

The current study results from the regression models revealed that self-efficacy was not significantly associated with chewing betel nut ($p = 0.419$). According to Sharma (2017), self-efficacy is considered the strongest predictor of the SCT. Wang et al. (2007)

employed self-efficacy in a health education intervention against betel nut chewing for adolescent students in Taiwan. Wang et al. explored the effects of preventive health education intervention in the knowledge, attitude, and practice of betel nut chewing, and the self-efficacy of anti-betel nut chewing. Wang et al. concluded that after intervention, there was significant difference in the attitude and practice of betel nut chewing, and self-efficacy of anti-betel nut chewing behavior among the students.

Self-efficacy is akin to the construct of perceived behavioral control in the theory of planned behavior Aizen (1991) and behavioral confidence in the MTM (Sharma, 2015). According to Sharma self-efficacy may have varying predictive power in different regions and cultures in the world and this may explain the difference in outcomes in the Solomon Island and Taiwan betel nut studies. Moreover, the construct of behavioral confidence of the MTM is reported as more culturally-specific than self-efficacy. Bennet et al. (2018) explained that the self-efficacy construct could be operationalized as behavioral confidence proposed in the MTM of health behavior change. Several studies employing the MTM have found that behavioral confidence was a useful predictor in the outcomes (Nahar et al., 2016). It would be a worthwhile consideration to use the MTM construct of behavioral confidence in future betel nut chewing behavior studies in the Solomon Islands.

Self-Efficacy in Overcoming Barriers to Chewing Betel Nut

The study results obtained from the regression models revealed that self-efficacy in overcoming barriers was significant and weakly associated with not chewing betel nut (p <.001). This construct was the only one found to have some association with not

chewing betel nut behavior in the study population. Self-efficacy to overcome barriers along with other SCT constructs explained 14% of the betel nut chewing behavior. In addition, there was a significant (p <.001) association between self-efficacy to overcome barriers to not chew betel nut and betel nut chewing. A unit increase in self-efficacy to overcome barriers resulted in a -0.26 decrease in betel nut use behavior.

The SCT construct of self-efficacy is influenced by a person's specific capabilities and other individual factors, as well as by environmental factors of barriers, and facilitators. Sharma (2015) in discussing the HBM stated that perceived barriers were the most important predictors of behaviors and addressing them would be essential for the model to be successful. SCT has been widely used in health promotion given the emphasis on the individual and the environment, the latter of which has become a major point of focus in recent years for health promotion activities. As with other theories, applicability of all the constructs of SCT to one public health problem may be difficult especially in developing focused public health programs (Sharma, 2015).

Self-Control and Betel Nut Chewing

Self-control was found not to be a significant predictor for not chewing betel nut in secondary school students in the study (p = 0.255). Sharma et al. (2004) stated that self-control involved setting goals that are proximal and distal and sets the course for change. The MTM of health behavior change also suggests a related construct of practice for change that entails goal setting and keeping track of one's behavior (Sharma, 2015; Bennet et al., 2018). This study finding relayed the importance students placed in either accepting or rejecting the decision whether to chew betel nut or not.

Some other studies using the SCT construct of self-control have demonstrated positive predictive power of the construct. Wills et al. (2008) tested the prediction that self-control would have buffering effects for adolescent substance use (tobacco, alcohol, and marijuana). The study findings concluded that the risk factors on substance use was reduced among persons with higher scores on good self-control (Wills et.al, 2008). Similarly, Priest, Knowlden, & Sharma (2015) used the SCT constructs to predict human papillomavirus (HPV) vaccination intentions in college men. The study concluded that situational perception and self-control were significant predictors, for college men accessing HPV. Utilizing self-control in prevention programs against betel nut chewing was an important consideration in this study. With the low predictive power demonstrated in this study, it would be worthwhile to consider incorporating the MTM construct of practice for change in future studies.

Environment and Betel Nut Chewing

The study results obtained from the regression models revealed that environment was not significantly associated with not chewing betel nut ($p = 0.197$). In the study the SCT construct was referred to both for the social and physical environment factors. Eslami et al. (2017) used the SCT as theoretical framework to predict sustained abstinence in a pool of Iranian substance users. In this study it was determined that the predictors of abstinence were perceived social support, treatment motivation, prior substance use treatment, and age of onset of substance use (Eslami et al., 2017). Both the physical and social environment factors are important for betel nut chewing behavior in this study population and setting.

The multi-theory model of health behavior change emphasized the role of physical environment in initiation of the behavior and social environment in sustenance of the behavior (Sharma, 2015). The conceptualization of the physical environment entails changes to obtainability, availability, accessibility, convenience, and readiness of resources (Bennet et al., 2018). In health education and health promotion for behavioral changes to betel nut chewing, limitation in obtainability and accessibility would at least support strategies to limit and curb use in the student population. Both physical and social environment should be ensured and strengthened in future betel nut use studies and interventions.

Covariates of Tobacco and Alcohol

Alcohol and tobacco use are two of the known covariates of betel nut chewing behavior. The stepwise multiple regression of all SCT constructs and the two covariates together showed that as a set, only self-efficacy to overcome barrier was significantly related to intent for not chewing betel nut ($p < .01$). In addition, covariates analysis showed that only smoking accounted for 4% of the variability in the outcome variable ($p < .05$).

Lin et al. (2006) examined the socio-demographic factors in betel quid chewing behavior and cessation patterns in Taiwan aborigines. The research findings reported that tobacco and betel nut quid use were independently and positively associated with alcohol drinking. In this study alcohol and tobacco use were initially analyzed alongside the SCT constructs as predictor variables to betel nut chewing behavior. Later the covariates were analyzed to determine if they confound the ability of the SCT construct to predict betel

nut chewing in high school students. The latter analysis finding showed that the SCT predictor variables explained an additional 12.5% of the variance after the effects of alcohol and smoking have been statistically controlled for. It was concluded that alcohol and smoking do not have any significant influence in the ability of the independent variables (SCT constructs), when taken as set, to predict betel nut use in high school students ($p < .05$).

Limitations of the Study

The cross-sectional design is one of the limitation to this study. The cross-sectional design captures a population in a single point in time and as such the study cannot assert any temporality of association of the variables under the study (Creswell, 2013). In addition, the study design cannot guarantee representativeness nor analyze behavior over a period of time. However, Bennet et al. (2018) suggested that theory constructs came before the behavior and hence it can be assumed that the SCT constructs indeed were precursors of the compliance behavior.

Another limitation in the study was related to the research instrument used. In the study, face, content, and construct validation were undertaken. The internal consistency of the instrument was assessed to be acceptable. However, as a school based survey, self-report survey instruments recording behavior have potential danger for inaccurate reporting (Kristjansson et al., 2013).

The length of the instrument, which was 37 items may have been too long for some students to comprehend and to give accurate responses to. This was evident in the study when students took from as early as 15 minutes and right up to 50 minutes to

complete the questionnaire. Study designs with a shorter research instruments would have been more feasible for this sub-population group. Separately in the pilot survey, test retest coefficients of the SCT constructs were all above 0.70 and was deemed satisfactory.

According to Bandura (1986) the SCT lacks recognition of genetic differences that could account for people's cognitive abilities and behavioral differences. In addition, the SCT does not adequately cater for the complexity of human behavior, personalities and biological predispositions that could influence behaviour (Bandura, 1986). However, since this was the first study on betel nut chewing behavior using the SCT, it would be interesting to compare findings from this Pacific Island student population to those in the same population subgroup in other parts of the world.

Recommendations

The main finding from this study showed that only one construct from the SCT was weakly predictive of the intent not to chew betel nut. Sharma and Petosa (2012) stated that in theory testing, parsimony was an important concept to understand and consider. The SCT has a number of constructs and five were employed to build a parsimonious model for this study. These constructs include; expectations for not chewing betel nut (combination score of outcome expectations and outcome expectancies), self-efficacy for not chewing betel nut, self-efficacy in overcoming barriers for not chewing betel nut, self-control for not chewing betel nut, and environment for not chewing betel nut. With self-efficacy to overcome barriers as the only significant SCT construct, this theory can be further improved by adding constructs

from newer theories such as multi-theory model of health behavior changes in future studies.

As a strength, this study has developed an instrument that could be used and improved upon in future studies. Since this was the first study using the SCT on betel nut chewing behavior, future studies should consider instruments that include additional constructs that can improve the predictability of the theory. In addition, future studies can build on this instrument by adding relevant constructs from other theories and testing them to various population subgroups in betel nut chewing regions of the world.

Separately, other health education and health promotion theories for behavioral change could be used for betel nut chewing behavior. The TTM is a health education and health promotion theory suitable for behavioral change but lacks predictability potential (West, 2005). Sharma (2015) proposed and presented the MTM which is exclusive to health education with tested constructs for behavioral change, is parsimonious, works at multiple levels, and is applicable across cultures. It is recommended that MTM be considered in future studies on betel nut chewing behavior as its constructs have components of both initiation and sustenance of health behavior change and which are key strategies in health promotion and interventions.

Implications

The rationale for conducting the study was to facilitate positive social change among adolescents at secondary schools and within communities by predicting betel nut use and influences. The findings of the study could help health education and health promotion specialists plan and strategize interventions targeting not only betel nut

chewing but also related substances use. Health educational programs could target the operationalization of self-efficacy as basis for health promotion interventions and in efforts to modify behaviors that affect decision making and coping.

This study used the SCT constructs as the theoretical base to test predictability to betel nut chewing behavior in high school students. The findings basically revealed that only one of the constructs was weakly predictive of betel nut chewing behavior. Whilst the same set of SCT constructs can be used in different country settings to test betel nut chewing behavior, a worthwhile consideration would be the employment of a similar theoretical model to test for the same behavioral outcome.

Implication for social change at the organizational level may involve initially thee Ministry of Health, schools and communities. To initiate and sustain health behavior, the involvement of key stakeholders in policy and planning would be important. Ministry of Health's role in health education could be complemented by policies to restrict access to betel nut by students. These initiatives could be supported by schools counselling services against substance use. Whilst community group interventions may not include policies on betel nut production, sales of the substance to minors could be monitored and restricted.

Conclusion

This was the first study on betel nut chewing behavior that employed the SCT to predict its use in high school students in a defined setting and population. Betel nut chewing is addictive and its long-term use could lead to serious health problems. In the study the estimated betel nut use prevalence was 68% in the 17 - 22 years' age group. In

similar age group but mostly out of school young people 15-24 years of age, Quinn et al. (2017) reported a prevalence rate of 88% in betel nut chewing along with tobacco use at 70% and all forms of alcohol use at 65%. The high prevalence rate of betel nut chewing in young people in Solomon Islands poised serious and ongoing challenges to authorities in their efforts to control substance use. Targeted and effective health education and health promotion strategies needed to be developed, maintained and supported at national, community and institutional levels for any reduction in the take up of the habit.

Behavioral change is the ultimate goal towards limiting betel nut chewing in young people. Therefore the use of theory that can be applied for behavior change at individual, group, and community levels would be the most ideal to employ. In the study the SCT was weakly predictive with low explained variance for not chewing betel nut in secondary school students. Of the five SCT constructs tested in the study, only self-efficacy to overcome barriers had a significant effect on betel nut chewing behavior. Similar to Bennet et al. (2018) summation, this study's findings showed that the SCT needs to be bolstered by newer theories like MTM of health behavior change for designing health educational interventions aimed at enhancing compliance.

References

American Psychological Association. (2010). *Publication manual of the American Psychological Association* (6th ed.). Washington, DC: Author.

Auluck, A., Hislop, G., Poh, C., Zhang, L., & Rosin, M. (2009). Areca nut and betel quid chewing among South Asian immigrants to Western countries and its implications for oral cancer screening. *Rural and Remote Health*, *9*(2), 1118. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2726113/

Aziz, S. (2010). Coming to America: Betel nut and oral sub mucous fibrosis. *Journal of the American Dental Association*, *141*(4), 423-428. http//doi.org/10.14219/jada.archive.2010.0194

Babbie, E. R. (2015). *The practice of social research*. Nelson Education. Retrieved from https://doi.org/10.4135/9781473999411

Bagherniya, M., Sharma, M., Mostafavi, F., & Keshavarz, S. M. (2015). Application of social cognitive theory in predicting childhood obesity prevention behaviors in overweight and obese Iranian adolescents. *International Quarterly of Community Health Education*, *35*(2), 133-147. doi:10.1177/0272684X15569487

Bandura A. (1986). Social Foundations of Thought and Action: A Social Cognitive Theory. Englewood Cliffs, NJ: Prentice-Hall.

Bandura A. 1997. *Self-efficacy: The exercise of control*. New York, NY: WH Freeman.

Bandura, A. (2004). Health promotion by social cognitive means. *Health Education & Behavior*, *31*(2), 143-164. doi: 10.1177/2F1090198104263660

Bandura, A. (2012). On the functional properties of perceived self-efficacy revisited.

https://doi.org/10.1177%2F0149206311410606

Beecher, D. M., Hartman, K. S., & Christen, A. G. (1985). Betel nut chewing in the United States: An old habit in a new country. *Journal (Indiana Dental Association)*, *64*(6), 42. Retrieved from; www.ncbi.nlm.nih.gov/pubmed/3867749

Benegal, V., Rajkumar, R., & Muralidharan, K. (2008). Does areca nut use lead to dependence? *Drug & Alcohol Dependence*, *97*(1/2), 114-121 doi:org/10.1016/j.drugalcdep.2008.03.016

Bennett, B., Sharma, M., Bennett, R., Mawson, A. R., Buxbaum, S. G., & Sung, J. H. (2018). Using social cognitive theory to predict medication compliance behavior in patients with depression in southern United States in 2016 in a cross-sectional study. *Journal of Caring Sciences, 7*(1), 1-8. doi:10.15171/jcs.2018.001

Brunnemann, K. D., & Hoffmann, D. (1992). Chemical composition of smokeless tobacco products. *Smokeless tobacco or health. An international perspective*. Retrieved from https://journals.sagepub.com/doi/abs/10.1177/08959374970110030301

Burns, N., & Grove, S.K. (2011). *Understanding nursing research: Building an evidence-based practice* (5th ed). Maryland Heights, MO: Elsevier Saunders.

Campbell, D. T., & Stanley, J. C. (1963). Experimental and quasi-experimental designs for research. *Handbook of research on teaching.* Chicago, IL: Rand McNally.

Campbell, D. T., & Stanley, J. C. (1979). Experimental and quasi-experimental research designs. In *Experimental and quasi-experimental research designs*. USP/EPU. https://doi.org/10.4135/9781483346229.n137

Champion, V. L., & Skinner, C. S. (2008). The health belief model: Health behavior and health education. *Theory, Research, and Practice, 4*, 45-65. https://s3.amazonaws.com/academia.edu.documents/49289960

Chen, K. T., Chen, C. J., Fagot-Campagna, A., & Narayan, K. M. (2001). Tobacco, betel quid, alcohol, and illicit drug use among 13-to 35-year-olds in I-Lan, rural Taiwan: Prevalence and risk factors. *American Journal of Public Health*, *91*(7), 1130. https://doi.org/10.2105/ajph.91.7.1130

Chen, H. Y., & Waigandt, A. C. (2009). Betel nut chewing behavior among adolescents in eastern Taiwan: A cluster analysis. *Journal of Drug Education*, *39*(1), 73-93. https://doi.org/10.2190/de.39.1.e

Chu, N. F., Wu, D. M., Shen, M. H., & Lin, Y. S. (2006). Prevalence of adverse behaviors among young military conscripts in Taiwan. *Military Medicine, 171*(4), 301-305. https://doi.org/10.7205/milmed.171.4.301

Cohen, J. (1992). A power primer. *Psychological Bulletin, 112*(1), 155. https://doi.org/10.1037/0033-2909.112.1.155

Connor, J. P., Gullo, M. J., Feeney, G. F. X., Kavanagh, D. J., & Young, R. M. (2013). The relationship between cannabis outcome expectancies and cannabis refusal self-efficacy in a treatment population. Addiction, 109(1), 111–119. doi:10.1111/add.12366

Cook, T. D., & Campbell, D. T. (1979). *Quasi-experimentation: Design and analysis for field settings*. City, ST: Rand McNally.

Cooper, G., Sharma, M., Bennett, R., Mawson, A. R., Buxbaum, S. G., & Sung, J. H.

(2016). Using social cognitive theory to predict preventive health screening behaviors among type 2 diabetics. *American Journal of Health Studies, 31*(2), 94-104.

Creswell, J. W. (2014). *A concise introduction to mixed methods research*. Sage Publications. https://doi.org/10.4135/9781071802823.n11

Croucher, R., & Islam, S. (2002). Socio-economic aspects of areca nut *use. Addiction Biology,* 7(1), 139–146. doi: 10.1080/13556210120091518

Dai, C. L., & Sharma, M. (2014). Predicting childhood obesity prevention behaviors using social cognitive theory for elementary school students in Taiwan. *International Journal of Health Promotion and Education, 52*(6), 339-345. doi:10.1080/14635240.2014.923283

Dijkstra, A., De Vries, H., & Roijackers, J. (1999). Targeting smokers with low readiness to change with tailored and non-tailored self-help materials. *Preventive Medicine,* 28(2), 203–211. doi:10.1006/pmed.1998.0407

Erdfelder, E., Faul, F., & Buchner, A. (1996). GPOWER: A general power analysis program. *Behavior Research Methods, Instruments, & Computers*, 28(1), 1–11. doi: 10.3758/bf03203630

Eslami, A. A., Norozi, E., Hajihosseini, M., Ramazani, A. A., & Miri, M. R. (2017). Social cognitive theory as a theoretical framework to predict sustained abstinence 6 months after substance use treatment. *Journal of Substance Use, 23*(3), 300–306. doi:10.1080/14659891.2017.1394382

Franke, A. A., Lai, J. F., Kawamoto, C. T., Pokhrel, P., & Herzog, T. A. (2014).

University of Hawaii ‘i Cancer Center connection: Areca (betel) nut consumption: an underappreciated cause of cancer. *Hawai’i Journal of Medicine & Public Health, 73*(12), 400. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4300551/

Frankfort-Nachmias, C., & Nachmias, D. (2008). Research designs: Cross-sectional and quasi-experimental designs. *Research methods in the social sciences*, 116.

Galea, S., & Tracy, M. (2007). Participation rates in epidemiologic studies. *Annals of epidemiology, 17*(9), 643-653. doi.org/10.1016/j.annepidem.2007.03.013

Gay, L. R., & Airasian, P. (2000). Educational research: Competencies for. *Analysis and application, (6th edition). Ohio: Prentice Hall*.

Glanz, K., & Bishop, D. B. (2010). The Role of Behavioral Science Theory in Development and Implementation of Public Health Interventions. *Annual Review of Public Health, 31*(1), 399–418. doi:10.1146/annurev.publhealth.012809.103604

Guo, S.-E., Huang, T.-J., Huang, J.-C., Lin, M.-S., Hong, R.-M., Chang, C.-H., & Chen, M.-Y. (2013). Alcohol, betel-nut and cigarette consumption are negatively associated with health promoting behaviors in Taiwan: A cross-sectional study. *BMC Public Health, 13*(1). doi:10.1186/1471-2458-13-257

Gullo, M. J., Matveeva, M., Feeney, G. F. X., Young, R. M., & Connor, J. P. (2017). Social cognitive predictors of treatment outcome in cannabis dependence. *Drug and Alcohol Dependence,* 170, 74–81. doi:10.1016/j.drugalcdep.2016.10.030

Hawkins, R. M. F. (1992). Self-efficacy: A predictor but not a cause of behavior. *Journal*

of Behavior Therapy and Experimental Psychiatry, 23(4), 251–256. doi:10.1016/0005-7916(92)90047-m

Heck, J. E., Marcotte, E. L., Argos, M., Parvez, F., Ahmed, A., Islam, T., Chen, Y. (2011). Betel quid chewing in rural Bangladesh: prevalence, predictors and relationship to blood pressure. *International Journal of Epidemiology, 41*(2), 462–471. doi:10.1093/ije/dyr191

Ghani, W. M., Razak, I. A., Yang, Y.-H., Talib, N. A., Ikeda, N., Axell, T. Zain, R. B. (2011). Factors affecting commencement and cessation of betel quid chewing behaviour in Malaysian adults. *BMC Public Health, 11*(1). doi:10.1186/1471-2458-11-82

Guo, S.-E., Huang, T.-J., Huang, J.-C., Lin, M.-S., Hong, R.-M., Chang, C.-H., & Chen, M.-Y. (2013). Alcohol, betel-nut and cigarette consumption are negatively associated with health promoting behaviors in Taiwan: A cross-sectional study. *BMC Public Health, 13(*1). doi:10.1186/1471-2458-13-257

Heck, J. E., Marcotte, E. L., Argos, M., Parvez, F., Ahmed, A., Islam, T. & Chen, Y. (2011). Betel quid chewing in rural Bangladesh: prevalence, predictors and relationship to blood pressure. *International Journal of Epidemiology, 41*(2), 462–471. doi:10.1093/ije/dyr191

IARC Working Group on the Evaluation of Carcinogenic Risks to Humans, World Health Organization, & International Agency for Research on Cancer. (2004). *Betel-quid and areca-nut chewing and some areca-nut-derived nitrosamines* (Vol. 85). IARC.

Johnson, B., & Christensen, L. (2000). *Educational research: Quantitative and qualitative approaches*. Allyn & Bacon. Retrieved from https://psycnet.apa.org/record/1999-04454-000

Kerlinger, F. N. (1986). Foundations of Behavioral Research. (3rd ed.) New York: Holt, Rinehart & Winston.

Kristjansson, A. L., Sigfusson, J., Sigfusdottir, I. D., & Allegrante, J. P. (2013). Data collection procedures for school-based surveys among adolescents: The Youth in Europe Study. *Journal of School Health, 83*(9), 662–667. doi:10.1111/josh.12079

Lee, C. T., McClernon, F. J., Kollins, S. H., Prybol, K., & Fuemmeler, B. F. (2013). Childhood economic strains in predicting substance use in emerging adulthood: Mediation Effects of Youth Self-Control and Parenting Practices. *Journal of Pediatric Psychology*, *38*(10), 1130–1143. doi:10.1093/jpepsy/jst056

Lin, C.-F., Wang, J.-D., Chen, P.-H., Chang, S.-J., Yang, Y.-H., & Ko, Y.-C. (2006). Predictors of betel quid chewing behavior and cessation patterns in Taiwan aborigines. *BMC Public Health, 6*(1).doi:10.1186/1471-2458-6-271

Lipsey, M. W., & Wilson, D. B. (1993). The efficacy of psychological, educational, and behavioral treatment: Confirmation from meta-analysis. *American Psychologist, 48*(12), 1181–1209. doi:10.1037/0003-066x.48.12.1181

McAlister, Alfred L., Cheryl L. Perry, and Guy S. Parcel. "How individuals, environments, and health behaviors interact." *Health Behavior* 169 (2008).

McNamee, R. (2005). Regression modelling and other methods to control confounding. *Occupational and Environmental Medicine, 62*(7), 500–506.

doi:10.1136/oem.2002.001115

Milgrom, P., Tut, O. K., Gilmatam, J., Gallen, M., & Chi, D. L. (2013). Areca use among adolescents in Yap and Pohnpei, the Federated States of Micronesia. *Harm Reduction Journal, 10*(1), 26. doi:10.1186/1477-7517-10-26

Miller, N. E., & Dollard, J. (1941). Social learning and imitation. https://doi.org/10.2307/2570586

Mirza, S. S., Shafique, K., Vart, P., & Arain, M. I. (2011). Areca nut chewing and dependency syndrome: Is the dependence comparable to smoking? a cross sectional study. *Substance Abuse Treatment, Prevention, and Policy*, *6*(1), 23. doi:10.1186/1747-597x-6-23

Murray, P. T., Smith, M. L., & Glass, G. V. (1987). Research and evaluation in education and the social sciences. *Teaching Sociology, 15*(4), 438. doi:10.2307/1318013

Nahar, V.K., Sharma, M., Catalano, H. P., Ickes, J., Johnson, P., Ford, M. A. (2016). Testing multi-theoretical model in predicting initiation and sustenance of physical activity behavior among college students. *Health Promotion Perspect 2016; 6* (2): 58-65. doi: 10.15171/hpp.2016.11.

Naylor, P., McKay, H. A., Valente, M., Mâsse, L. C., & Mâsse, L. C. (2016). A mixed-methods exploration of implementation of a comprehensive school healthy eating model one year after scale-up. *Public Health Nutrition, 19*(5), 924-934. doi:10.1017/S1368980015001482

Nunnally, J. (1978). C. (1978). Psychometric theory. *Auflage, New York ua: Mc Graw-Hill*. doi.org/10.1108/13555851111165020

Oakley, E., Demaine, L., & Warnakulasuriya, S. (2005). Areca (betel) nut chewing habit among high-school children in the Commonwealth of the Northern Mariana Islands (Micronesia). *Bulletin of the World Health Organization*, *83*(9), 656-660. Retrieved from https://www.scielosp.org/article/bwho/2005.v83n9/656-660/pt/

Ogden, J. (2003). Some problems with social cognition models: a pragmatic and conceptual analysis. *Health Psychol.* 2003; 22:424–428. https://psycnet.apa.org/doi/10.1037/0278-6133.22.4.424

Ogunkolade, W. B., Boucher, B. J., Bustin, S. A., Burrin, J. M., Noonan, K., Mannan, N., & Hitman, G. A. (2006). Vitamin D metabolism in peripheral blood mononuclear cells is influenced by chewing "Betel Nut" (Areca catechu) and Vitamin D status. *The Journal of Clinical Endocrinology & Metabolism, 91*(7), 2612–2617. doi:10.1210/jc.2005-2750

Ome-Kaius, M., Unger, H. W., Singirok, D., Wangnapi, R. A., Hanieh, S., Umbers, A. J., & ... Rogerson, S. J. (2015). Determining effects of areca (betel) nut chewing in a prospective cohort of pregnant women in Madang Province, Papua New Guinea. *BMC Pregnancy and Childbirth, 15*177. doi:10.1186/s12884-015-0615-z.

Onwuegbuzie, A. J. (2000). Expanding the framework of internal and external validity in quantitative research. Retrieved from https://eric.ed.gov/?id=ED448205

Painter, J. E., Borba, C. P. C., Hynes, M., Mays, D., & Glanz, K. (2008). The use of theory in health behavior research from 2000 to 2005: A Systematic Review. *Annals of Behavioral Medicine, 35*(3), 358–362. doi:10.1007/s12160-008-9042-y

Palmer, R. H. C., Young, S. E., Hopfer, C. J., Corley, R. P., Stallings, M. C., Crowley, T.

J., & Hewitt, J. K. (2009). Developmental epidemiology of drug use and abuse in adolescence and young adulthood: Evidence of generalized risk. *Drug and Alcohol Dependence, 102*(1-3), 78–87. doi:10.1016/j.drugalcdep.2009.01.012

Peralta, R. L., & Steele, J. L. (2010). Nonmedical prescription drug use among US college students at a Midwest university: a partial test of social learning theory. *Substance Use & Misuse, 45*(6), 865–887. doi:10.3109/10826080903443610

Peter, J., & Samo, M. (n.d.). Federated States of Micronesia: Islands in the sun. *International and Cultural Psychology Series*, 133–144. doi:10.1007/0-387-23289-3_6

Pobutsky, A. M., & Neri, E. I. (2012). Betel nut chewing in Hawai'i: Is it becoming a public health problem? Historical and socio-cultural considerations. *Hawai'i Journal of Medicine & Public Health: A Journal of Asia Pacific Medicine & Public Health, 71*(1), 23. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3298432/

Priest, H. M., Knowlden, A. P., & Sharma, M. (2015). Social cognitive theory predictors of human papillomavirus vaccination intentions of college men at a Southeastern University. *International Quarterly Of Community Health Education, 35*(4), 371-385. doi:10.1177/0272684X15583289

Prochaska JO, Redding CA, Evers KE. 2008. The trans theoretical model and stages of change. *Health Behavior and Health Education: Theory, Research, and Practice. San Francisco, CA: Jossey-Bass*, 97-121.

Quinn, B., Peach, E., Wright, C. J. C., Lim, M. S. C., Davidson, L., & Dietze, P. (2017).

Alcohol and other substance use among a sample of young people in the Solomon Islands. Australian and New Zealand Journal of Public Health, 41(4), 358–364. doi:10.1111/1753-6405.12669

Rai, M. P., Thilakchand, K. R., Palatty, P. L., Rao, P., Rao, S., Bhat, H. P., & Baliga, M. S. (2011). Piper betel Linn (betel vine), the maligned Southeast Asian medicinal plant possesses cancer preventive effects: time to reconsider the wronged opinion. *Asian Pacific Journal of Cancer Prevention: APJCP*, *12*(9), 2149-2156. Retrieved from https://pdfs.semanticscholar.org/b620/756327fa99d054b7d755face059ac2f3df87.

Rosenstock, I. M., Strecher, V. J., & Becker, M. H. (1988). Social learning theory and the health belief model. *Health Education Quarterly*, 15(2), 175–183. doi:10.1177/109019818801500203

Sallis, J. F., & Orleans, C. T. (n.d.). Ecological Models: Application to Physical Activity. Encyclopedia of Health and Behavior. doi:10.4135/9781412952576.n85

Salkind, N. J. (2010). *Encyclopedia of research design* Thousand Oaks, CA: SAGE Publications Ltd doi: 10.4135/9781412961288

Shah, S., Merchant, A., Luby, S., & Chotani, R. (2002). Addicted schoolchildren: Prevalence and characteristics of areca nut chewers among primary school children in Karachi, Pakistan. *Journal of Paediatrics and Child Health, 38*(5), 507–510. doi:10.1046/j.1440-1754.2002.00040.x

Shafique, K., Zafar, M., Ahmed, Z., Khan, N. A., Mughal, M. A., & Imtiaz, F. (2013). Areca nut chewing and metabolic syndrome: evidence of a harmful relationship.

Nutrition Journal, 12(1). doi:10.1186/1475-2891-12-67

Sharma, M. (2005). Enhancing the effectiveness of alcohol and drug education programs through social cognitive theory. *Journal of Alcohol and Drug Education, 49*(3), 3-7. Retrieved from https://search.proquest.com/openview/95dac2bef9257c12d38da2c33f508618/1?pq-origsite=gscholar&cbl=48458

Sharma, M. (2015). Multi-theory model (MTM) for health behavior change. *Webmed Central BEHAVIOUR 2015;6(9):WMC004982* Retrieved from *http://www.webmedcentral.co.uk/article_view/4982*

Sharma, M. (2017). *Theoretical foundations of health education and health promotion.* (3rd ed.) Burlington, MA: Jones and Bartlett. ISBN# 978-1-2841-0494-3.

Sharma, M., Catalan, H. P., Naha, V. K., Lingam, V., Johnson, P., Ford, M. A. (2016). Using the multi-theory mode of health behavior change to predict portion size consumption among college students. *Health Promotion Perspective 2016; 6* (3): 137-44. doi: 10.15171/hpp. 2016.22

Sharma, M., & Petosa, R. L. (2014). *Measurement and evaluation for health educators*. Jones & Bartlett Publishers.

Sharma, M., Wagner, D. I., & Wilkerson, J. (2004). Predicting childhood obesity prevention behaviors using social cognitive theory. *International Quarterly of Community Health Education, 24*(3), 191–203. doi:10.2190/cpvx-075a-l30q-2pvm

Stone, E. F. (1978). *Research methods in organizational behavior*. Goodyear Publishing Company.

Story, M., Kaphingst, K. M., Robinson-O'Brien, R., & Glanz, K. (2008). Creating healthy food and eating environments: policy and environmental approaches. *Annual Review of Public Health, 29*(1), 253–272. doi:10.1146/annurev.publhealth.29.020907.090926

Strickland, S. S. (2002). Anthropological perspectives on use of the areca nut. *Addiction Biology, 7*(1), 85–97. doi:10.1080/13556210120091446

Sullivan, R. J., & Hagen, E. H. (2002). Psychotropic substance-seeking: evolutionary pathology or adaptation? *Addiction, 97*(4), 389–400. doi:10.1046/j.1360-0443.2002.00024.x

Tabachnick, B. G., & Fidell, L. S. (2007). *Experimental designs using ANOVA*. Thomson/Brooks/Cole.

Tareg, A. R. C., Modeste, N. N., Lee, J. W., & Santos, H. D. (2015). Health beliefs about tobacco with betel nut use among adults in Yap, Micronesia. *International Quarterly of Community Health Education, 35*(3), 245–257. doi:10.1177/0272684x15581344

Tovosia, S., Ko, A. M.-J., Chen, P.-H., Tsai, P.-C., Tu, H.-P., & Ko, Y.-C. (2007). Prevalence and associated factors of betel quid use in the Solomon Islands: A hyper endemic area for oral and pharyngeal cancer. *The American Journal of Tropical Medicine and Hygiene, 77*(3), 586–590. doi:10.4269/ajtmh.2007.77.586

Trivedy, C. R., Craig, G., & Warnakulasuriya, S. (2002). The oral health consequences of

chewing areca nut. *Addiction Biology*, *7*(1), 115–125. doi:10.1080/13556210120091482

Tseng, C.-H. (2010). Betel nut chewing and incidence of newly diagnosed type 2 diabetes mellitus in Taiwan. BMC Research Notes, 3(1). doi:10.1186/1756-0500-3-228

Urban, B. (2006). Entrepreneurial self-efficacy in a multicultural society: Measures and ethnic differences. *SA Journal of Industrial Psychology*, *32*(1). doi:10.4102/sajip.v32i1.221

Wang, S.-C., Tsai, C.-C., Huang, S.-T., & Hong, Y.-J. (2007). The effects of preventive intervention for betel nut chewing in school. *Substance Abuse, 28*(2), 9–19. doi:10.1300/j465v28n02_03

Warren, C. W., Lea, V., Lee, J., Jones, N. R., Asma, S., & McKenna, M. (2009). Change in tobacco use among 13-15 year olds between 1999 and 2008: findings from the Global Youth Tobacco Survey. *Global health promotion*, *16*(2_suppl), 38-90.

Weekes, C. N., Haas, B. K., & Gosselin, K. P. (2014). Expectations and self-efficacy of African American parents who discuss sexuality with their adolescent sons: An intervention study. *Public Health Nursing*, *31*(3), 253-261. doi:10.1111/p

Wen, C. P., Tsai, S. P., Cheng, T. Y., Chen, C. J., Levy, D. T., Yang, H. J., & Eriksen, M. P. (2005). Uncovering the relation between betel quid chewing and cigarette smoking in Taiwan. *Tobacco Control*, *14*(suppl1), i16-i22. doi:10.1136/tc.2004.008003

West R. (2005). Time for a change: putting the trans-theoretical (stages of change) model

to rest [Editorial]. *Addiction.* 2005; 100:1036–1039.

Wills, T., Ainette, M., Stoolmiller, M., Gibbons, F., Shinar, O., Wills, T. A., & ... Shinar, O. (2008). Good self-control as a buffering agent for adolescent substance use: an investigation in early adolescence with time-varying covariates. *Psychology Of Addictive Behaviors*, *22*(4), 459-471. doi:10.1037/a0012965

Will JC, Farris RP, Sanders CG, Stockmyer CK, Finkelstein EA. 2004. Health promotion interventions for disadvantaged women: overview of the WISEWOMAN projects. *J. Women's Health* 13:484–502. doi:10.1089/1540999041281025

Williams, S., Malik, A., Chowdhury, S., & Chauhan, S. (2002). Sociocultural aspects of areca nut use. *Addiction Biology*, *7*(1), 147–154. doi:10.1080/135562101200100147

Woodward, M. (2013). Epidemiology: study design and data analysis. *CRC press. Technometrics*, *42*(3), 327. doi:10.2307/1271123

World Health Organization. (2010). *Solomon Islands NCD Risk Factors STEPS REPORT*. Suva (FIJI): WHO Western Pacific Region.

World Health Organization. (2012). *Review of areca (betel) nut and tobacco use in the Pacific: a technical report*. Manila: WHO Regional Office for the Western Pacific. Retrieved from https://iris.wpro.who.int/bitstream/handle/10665.1/5281/9789290615699_eng.pdf

Yang, T., & Lin, H. (2016). Taking actions to quit chewing betel nuts and starting a new life: taxi drivers' successful experiences of quitting betel nut chewing. *Journal of Clinical Nursing*, doi:10.1111/jocn.13599.

Appendix A: Betel Nut Chewing Behavior Questionnaire

Betel Nut Chewing Behavior Questionnaire

Date: _____ ID Number: _____

Directions

1. Do not write your name or identify your school in the questionnaire.
2. Please fill in or tick your answers in the relevant spaces or boxes.
3. Do attempt to answer all the questions asked.
4. Do not seek answers from your friend for any of the questions tabled.
5. Upon completion, please hand over questionnaire to the instructor.

A. Demographic

1. What is your Gender? 1 – Male ☐ 2 - Female ☐
2. What is your Age today? ☐
3. What Province are you from?

1.	Central	
2.	Western	
3.	Guadalcanal	
4.	Malaita	
5.	Choiseul	
6.	Temotu	
7.	Rennel & Bellona	
8.	Makira & Ulawa	
9.	Isabel	
10.	Other	

4. What is your Religion?

1.	Christian	
2.	Muslim	
3.	Hindu	
4.	Buddhist	
5.	Other	
6.	None	

B. Previous exposure to betel nut or substance use health education sessions.

5. Have you ever attended a betel nut use awareness programme?

0.	None	
1	Once	
2	Twice	
3	Three times	
4	More than three times	

C. Betel nut chewing behavior

6. Have you ever chewed betel nut?

0.	Never chewed	
1.	Chewed once or twice in the past	
3	Current user once a month	
3	Current user at least once per week	
4	Current user daily or every other day	

7. Do you currently smoke? ☐ No (0) ☐ Yes (1)

8. Do you currently drink alcohol? ☐ No (0) Yes (☐

D. Outcome expectations to not chew betel nut.

How closely do the following statements relate to you?

	Never (1)	Hardly Ever (2)	Sometimes (3)	Almost Always (4)	Always (5)
9. If you do not chew betel nut, you will have better health.					
10. If you do not chew betel nut your class performance will improve.					
11. If you do not chew betel you will have more time for physical activities.					
12. If you do not chew betel nut, you will have cleaner teeth.					
13. If you do not chew betel nut, you will eat school lunches better.					

E. Outcome expectancies

How important are these statements to you if you choose not to chew betel nut?

	Not important (1)	Slightly important (2)	Moderately important (3)	Very important (4)	Extremely important (5)
14. Being healthy.					
15. Improving your class performance.					
16. Having more time for physical activities.					
17. Having cleaner teeth.					
18. Eating school lunches better.					

F: Self-efficacy for not chewing betel nut

When choosing not to chew betel nut, how confident are you of taking the following actions:

	Not at all sure (1)	Slightly sure (2)	Moderately sure (3)	Very sure (4)	Completely sure (5)
19. If coerced forced to chew betel nut, you have confidence in your ability to oppose. .					
20. You could deal efficiently with tempting events and not chew betel nut.					
21. When encountering study stressors, you can usually find several solutions to address them instead of chewing betel nut.					
22. Passing by the betel nut stand and not be tempted to buy it.					
23. Being with others who chew the betel nut and not chewing it yourself.					

G: Self-efficacy in overcoming barriers while choosing not to chew betel nut.

How confident are you in performing the following?

	Not at all sure (1)	Slightly sure (2)	Moderately sure (3)	Very sure (4)	Completely sure (5)
24. You can refuse to chew betel nut even if your close friends chew the nut in front of you.					
25. You can refuse to chew betel nut even if your parents chew the nut at home.					
26. You can refuse to chew betel nut even if it is readily accessible to you.					
27. You can refuse to chew betel nut even if your family sells betel nut.					
28. You can refuse to chew betel nut even if you are under a lot of stress.					
29. You can refuse to chew betel nut even if it you are really hungry.					

H: Self-control to not chew betel nut.

How relevant are these statement if you choose not to chew betel nut now?

	Not at all sure (1)	Slightly sure (2)	Moderately sure (3)	Very sure (4)	Completely sure (5)
30. You are able to set goals towards not chewing betel nut.					
31. You can keep track of your progress toward not chewing betel nut.					
32. You can reward yourself for progress toward the goal of not chewing betel nut.					

I: Environment factors (social and physical) aiding in not chewing betel nut

In your decision not to chew betel nut, what are your perceptions of the following provisions?

	Strongly disagree (1)	Disagree slightly (2)	Agree slightly (3)	Agree (4)	Strongly agree (5)
33. That betel nut be not available at home.					
34. That betel nut not be available around school.					
35. That you have support for choosing not to chew betel nut.					
36. That school policies prohibit betel nut chewing.					
37. Betel nut sales are restricted in your village/town.					

Thank you for participating in this survey.

Appendix B: Email Letter of Invitation for Expert Review of Questionnaire

Dear …….

I am a PhD student at Walden University and currently undertaking my dissertation under the supervision of Dr. Manoj Sharma. This is my 5th year at the university and currently preparing for dissertation research work. My research topic is on the use of the SCT to predict betel nut use in high school students in the Solomon Islands. I have read and cited your work and publication in my literature review and would to know and request if you could be kind enough to review my research instruments as an expert on theory and or instrumentation. I am attaching herein the questionnaire and definition documents for your information.

Thanking you in anticipation.

Yours sincerely,

Lepani Waqatakirewa
PhD (PH) student