International Journal of Technology and Management



Cognitive Factors and Health Behaviors of Social Media Users In Sub-Saharan Africa

IJOTM
ISSN 2518-8623
DOI: 10.67610/ijotm.6.1.001
Volume 6. Issue I
pp. 1-21, July 2021
ijotm.utamu.ac.ug
email: ijotm@utamu.ac.ug

Kituyi G. Mayoka
Makerere University Business School
Email: kimayoka@gmail.com

Clive K. Tsuma
ICT University
Email: cktsuma@gmail.com

Victor Mbarika
East Carolina University
Email: victor@mbarika.com

Abstract

This study investigated the mediation effect of Locus of Control, Self-Regulation, Age sensitivity and Behavioral Intention in the relationship between Cognitive Factors and Health Behaviors of social media users in Sub-Sahara Africa.

A positivist epistemology was adopted in trying to create knowledge from empirical and observational evidences across Sub-Saharan Africa. Data were collected from 450 social media users in Uganda, Cameroon and Nigeria. Descriptive statistics, correlation and regression analysis methods were used to analyze the data. Baron and Kenny procedure and Medgraphs by Jose were used to test for mediation.

Findings reveal that Internal Locus of Control and Behavioral Intention mediate the relationship between Cognitive Factors and Health Behavior; Self-Regulation mediates the relationship between Cognitive Factors and External Locus of Control; External Locus of Control mediates the relationship between Self-Regulation and Health Behavior; Self-Regulation mediates the relationship between Cognitive Factors and Health Behavior; Self-Regulation mediates the relationship between Age Sensitivity and Health Behavior. The findings however reveal that External Locus of Control does not mediates the relationship between Cognitive Factors and Health Behavior.

In order to promote the learning of positive health behaviors amongst social media users in Sub-Saharan Africa, Self-Regulation and External Locus of Control should be enhanced.

Key words
Internal Locus of Control; External Locus of Control; Self-Regulation; Age Sensitivity; Behavioral Intention; Cognitive Factors; Health Behaviors; Social Media

Introduction
Technology has become a driving force in almost every aspect of life. Innovations that address the challenges and the wellbeing of man are sprouting up – many of these in the area of Information Communication Technology (ICT). ICT is the umbrella word for all elements of communication equipment (Rouse, 2014). It includes hardware, software and liveware that operate to accept and process data, store and disseminate information to the users. These include – but not limited to computer hardware and software, radios, phones, televisions and communications networks. ICTs are being used in all business disciplines across the globe. Different ICT applications have been developed for use in areas such as education - for the case of e-learning and education management systems, healthcare such as hospital information management systems, telemedicine applications, and general communications such as Social Media (SM) and social networks, telecommunications, among others (Hilliard, 2012).

There are different categories of users engaged on these media including young and old professionals, marketers, politicians, spiritual leaders, and educationists. Anyone can create or consume information as long as they have access to the internet. Abbasi *et al.* (2016) posits that social media platforms have transformed information consumers into information producers. A lot of the social media information is health-related. The PWC Health Research Institute (2012) posits that people in the United Stated of America (USA) are increasingly using social media to exchange health-related information. Patients in most developed countries and some developing countries are able to access health information, share their health problems and get assistance via some kind of social media. The active engagement, instant sharing and consumption of information via social media is influencing behavior in various forms. Even those behaviors that are not necessarily originating from a health perspective may in the long run have health bearings on the consumers. Overtime, behaviors are being learned and unlearned (Abbasi *et al.* 2016; Cui, 2016). Some of these behaviors influence the health of consumers which this study proposes to examine. This study sought to investigate the mediation effect of External Locus of Control, Internal Locus of Control, Self-Regulation, and Behavioral Intention in the relationship between Cognitive Factors and Health Behavior of social media users in Sub-Sahara Africa.

1. Literature Review

1.2 Social media and health behavior in developed countries

Though relatively new compared to traditional approaches, social media usage in health communication is being applied across the developed world to solve medical and public health problems. For example, a study conducted by Wright (2016) on social networks and health support services revealed that social media was a key tool in providing interpersonal social support for positive health outcomes in communities. Adewuyi and Adefemi (2016) further show that social media were being used by health professionals to influence health

behaviors across nations. They however, caution about usage of social media without proper strategies as it could lead to negative health behavioral outcomes and called for active user involvement of relevant stakeholders in designing of health communication strategies for social media. Newbold and Campos (2011) argue that whereas usage of traditional channels for communicating public health information had proved effective in transforming health behavior, little empirical evidence existed for the case of social media, thereby making it difficult to establish with certainty the efficacy of social media in health behavioral change.

Recent literature reveals that the impact of social media on health behavior in developed countries was immense. It is both negative and positive and is most outstanding amongst teenagers and youth who were the most vulnerable groups to social media. These groups were the biggest users of social media. Carroll and Kirkpatrick (2011) reveal that whereas social media helped teenagers to create useful networks and develop their identities, sexuality and self-esteem in the USA. The technology exposed teenagers to various risks. Teens who regularly used social media stood high chances of developing mental health problems, due to peer rejection and cyber bullying (Boyar, 2010) leading to depression and stress. According to (Salathé et al. 2017), social media was a practical avenue where individuals got exposed to negative sentiments. This is supported by Rideout (2010) who established that regular social media users exhibited signs of low esteem, dissatisfaction with their physical and material abilities, unhappiness and boredom (Boyar, 2010).

Scholarly initiatives have been tried to address the challenges being brought in by social media in developed countries. For example, studies were conducted to see how best social media could be used without causing the negative effects to society (e.g., Adewuyi & Adefemi, 2016; Centola, 2013; Korda & Itani, 2011; Centola, 2010; Smith & Christakis, 2008). Newbold and Campos (2011) postulate that social was showing great potential and could become a tool of choice for health communication in the near future given its growing wide usage. Therefore, there was a need for development of standards, policies and legal frameworks to foster best practices in the application of social media in health communication (Newbold & Campos, 2011).

1.3 Theoretical framework

This study was grounded on the Social cognitive theory of Albert Bandura which posits that Cognitive Factors play a big role in causing behavioral change through the process of reciprocal determinism with other constructs (Bandura, 1986). In addition, we borrow the constructs of Internal Locus of Control and External Locus of Control that were identified as important factors in influencing the learning of new behaviors by Rotter in his Social Learning Theory (Rotter, 1966). Another hypothetical addition to the study is the role of age in moderating behavioral learning process as had been proposed by researchers in the field of psychology. In this Age Sensitivity is hypothesized to moderate the relationship between Cognitive Factors and Self-Regulation. Individuals' level of age sensitivity either increases or reduces the influence of their Cognitive Factors on Self-Regulation in the behavioral learning process. Further, studies by Bandura (1986; 1988), and Rotter (1966) show that locus of control influence behavior through increasing or decreasing the learner's behavioral intention. However, Rotter (1966) cautions that locus of control is relevant only in a responsive environment. Hence, in this study, we hypothesize that both internal and external locus of control influence

behavioral intention of social media users. Where there is locus of control, social media users are more open to adopt new observed behaviors from elements in the environment and the reverse is true.

The other constructs hypothesized in this study are Self-Regulation (Blalock et al. 2016; Bandura 1988; 1986) and Behavioral Intention (Venkatesh el al. (2003). In this study, Cognitive Factors positively influence Self-Regulation while Self-Regulation is also hypothesized to have a positive influence on the External Locus of Control as well as Health Behavior. On the other hand, Behavioral Intention is hypothesized to positively influence Health Behavior as well as mediate the relationship between Internal Locus of Control and Health Behavior. Figure 1 presents the conceptual framework.

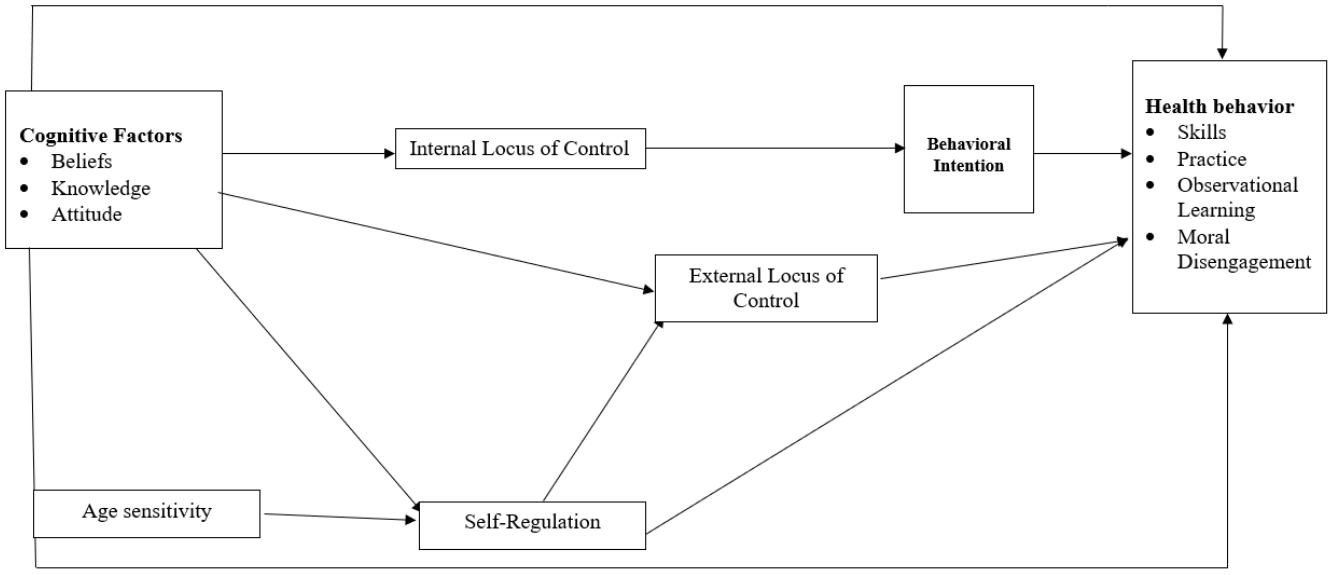


Figure 1: Conceptual framework (Source: Bandura, 1965; Rotter, 1966; Bandura, 1986; Venkatesh et al. 2003)

2.3 Research hypotheses

The study tested six hypotheses stated below:

H1: *Internal Locus of Control and Behavioral Intention mediate the relationship between Cognitive Factors and Health Behavior of social media users in Sub-Sahara Africa.*

H2: *Self-Regulation mediates the relationship between Cognitive Factors and External Locus of Control of social media users in Sub-Sahara Africa.*

H3: *External Locus of Control mediates the relationship between Self-Regulation and Health Behavior of social media users in Sub-Sahara Africa.*

H4: *Self-Regulation mediates the relationship between Cognitive Factors and Health Behavior of social media users in Sub-Sahara Africa.*

H5: *External Locus of Control mediates the relationship between Cognitive Factors and Health Behavior of social media users in Sub-Sahara Africa.*
H6: *Self-Regulation mediates the relationship between Age Sensitivity and Health Behavior of social media users in Sub-Sahara Africa.*

2. Methodology

2.2 Research epistemological orientation and design

Tennis (2008) defines epistemology as "how we know". It is a term used to describe the process of discovering knowledge through scientific methods. It is used to validate justifications about truths and beliefs. It centers on philosophical analysis, problems of skepticism, sources of information, and mechanisms for validating new knowledge. Dretske (2016) argues that epistemology is one effective way of doing cognitive science since it helps researchers to understand how knowledge is sourced, processed and extended. It encompasses critical reasoning also known as critical realism (Hjørland, 2004).

Epistemology helps scholars to differentiate knowledge from beliefs, truths and justifications. There are cases where truths held in society about something transform into knowledge. However, such knowledge is obscure without justifications. This is because the beliefs may be mistaken and untrue. Therefore, for a belief to become knowledge, it must be true and justifiable.

Currently, there are beliefs that social media influences Health Behavior of its users. It is also true that social media are influence behavior of its users. However, these beliefs and truths are unsubstantiated and unsupported because there is no empirical justification. Hence, in this study, the main aim will be to justify these beliefs and truths about the influence of social media on Health Behavior. These justifications can then help us build knowledge through development a theoretical model explaining the relevant factors and constructs responsible for social media and health behavioral change.

Although little literature exists on the term, different schools of thought have proposed various types of epistemology as; positivist epistemology – which posits that scientific knowledge should emerge from observable scientific evidence (IGI, 2016); genetic epistemology – which is a study aimed at understanding the original sources of knowledge (Wikipedia, 2016a), or the genesis of knowledge; feminist epistemology - which is a study of knowledge from a feminist point of view (Wikipedia, 2016b); social epistemology - which construes knowledge as a collective work of society (Wikipedia, 2016c); constructivist epistemology - which is a study of natural science embedded in and can be explained by mental constructs of nature by measuring them (Wikipedia, 2016d).

This study used a positivist epistemology in trying to create knowledge from empirical and observational evidences across Sub-Saharan Africa region. The type of epistemology assumes that the researcher is independent of the study. This helps to alleviate biases. Hence it is the most appropriate epistemological

orientation for the current study. Further, the study adopted a cross-sectional research design where data were collected at one point in time.

2.3 Study population and sample

According to Internet World Statistics (2015), Sub-Saharan Africa has a population of 943,445,548 people. However, given that this study is targeting SM users, the general population cannot work as our study population. This is because out of the 943,445,548 people, only 234,342,776 people use the internet and only 68,968,500 people use Facebook (Internet World Statistics, 2015). Further, given that Facebook alone cannot represent SM (as had been defined in chapter two), we were unable to use the total number of Facebook users as our study population. In this case therefore, the actual study population remained unknown. Generally, however, as of the year 2013, the population of Cameroon was 22 million people; the population of Nigeria was 174 million people and the population of Uganda was 38 million people. Hence, if we were to look at the entire population with no regard to social media usage, the study population would have been 234m people. However, we could not use country populations because this study targeted social media users only.

Given that the study population was unknown, a formula for determining sample sizes using population proportion (Hyde, 2017) was used with the following assumptions:

- Population proportion = 0.5
- Margin of error = 4%
- Confidence level = 95% (z=1.96)

Determining sample for each country

$$n = p(1-p)\left(\frac{z}{E}\right)^2$$

Where;
p = population proportion / percentage picking a choice of 50% (0.5)
z = standard normal deviation set at 95% confidence level (1.96)
E = Estimate / Margin of error $\pm 4\%$

$$n = 0.5(1-0.5)\left(\frac{1.96}{0.04}\right)^2$$

$$n = 0.25(49)^2$$

$$n = 12.25^2$$

$$n = 150.0625$$

$n = 151$

Hence total sample for all three countries = 152 x 3 = 453

2.4 Mediator variables

A mediator variable is one that connects a linkage between the independent and dependent variables. It is a third variable influencing a zero-order correlation (Statistics Solution, 2016; Baron & Kenny, 1986). Mediator variables in this study are; External Locus of Control, Internal Locus of Control, Self-Regulation and Behavioral Intention.

2.5 Measurement and operationalization of variables

Each variable and construct were measured by a set of items evaluated on a 5-point likert scale. The operationalization of each variable and the theories used to measure it are discussed below:

Cognitive Factors are attributes unique to an individual such as knowledge, beliefs and attitudes that help in the learning process. This variable was structured into three constructs namely Knowledge, Beliefs and Attitudes. Knowledge investigated whether respondents had the necessary knowledge, skills and experience for using the technology as well as examining whether respondents knew the benefits of using social for health-related purposes.

On the other hand, the construct of Beliefs was used to investigate respondents' beliefs, cultural norms, religion and traditions allowed them to use social media for purposes of sharing and consuming health related information via social media.

Similarly, the construct of Attitudes was used to study the respondents' attitudes towards using social media to access and consume health related information. The relevant theories and literature that informed Cognitive factors as a variable were Bayrón (2013) and Bandura (1986).

Internal Locus of Control is used to refer to an individual's locus of control or state of being where one controls the consequences of his / her behavior. This variable was used to investigate whether respondents controlled the consequences of their actions while using social media. The variable also investigated whether respondents maintained interpersonal relations, made greater efforts to learn, were in in charge of my activities and assumed success or failure before taking action while using social media. These were proposed by Boundless (2016) and Rotter (1966).

On the other hand, External Locus of Control is used to refer to an individual's locus of control or state of being where one is unable to controls the consequences of his / her behavior. Consistent with Boundless (2016) and Rotter (1966), External Locus of Control variable was employed to examine whether respondents were not in control of the consequences, achieve less, had low morale to learn, did not maintain good

relations, considered themselves lucky, were not responsible for the bad things that happen to them, did not think about the consequences of their actions before doing them, and if the respondents were unable to help themselves when faced with challenging situations while using social media.

Self-Regulation postulates the extent to which an individual internally controls himself or herself in the face of imitation and observation of new behavior. Self-Regulation was measured by Blalock et al. (2016), Winters et al. (2003) and Bandura (1988; 1986). The variable investigated among others whether respondents freely brought up a health-related issue to their peers, friends and family, freely disclosed their health-related problems to their peers, friends and family, freely challenged their peers, friends and family on health-related matters via social media.

Age Sensitivity is used to refer to the feelings an individual has towards people of different age groups. This variable was measured by literature from WHO (2000) and NIHCE (2007) and aimed to investigate whether respondents freely interacted with people of different age groups via social media on health-related matters, freely interacted with people of their age group via social media on health-related matters, and also whether the respondents did do not mind learning new health behaviors from people of different ages as well as their own age group via social media.

Behavioral Intention is used to show the likelihood that an individual or community will learn new behaviors. It was measured by Venkatesh el al. (2003). This variable was employed to examine whether respondents intended to acquire new health skills, knowledge and practices via social media.

Finally, the variable Health Behavior is used to refer to learned action, skills, practices an individual does that influence his wellbeing in terms of health. It was measured by Bandura (1986); Blalock et al. (2016); Winett et al. (1999); Bandura (1990); Blalock et al. (2016); Kane (2004). This variable was structures into four constructs namely; Skills, Practice, Observational learning, and Moral degeneration.

Skills construct was used to study whether respondents learned new health related skills by using social media. It also investigated whether respondents were able to treat diseases, manage chronic diseases and also whether they learned how to look after patients using information obtained via social media.

The construct of Practice was used to study whether respondents learned new health related behavioral practices through observing role models and training themselves via social media.

Observational learning construct on the other hand was used to establish whether respondents learned new health related behaviors by observing other influential people in society such as celebrities, political leaders, elders, religious do them.

Lastly, Moral degeneration construct was used to study whether respondents learned new health related behaviors that decayed their morals by using social media. It investigated whether respondents learned how to

and actually smoked, used drugs, drunk alcohol, consumed pornography, became gay, and had sex with multiple partners because of the information they consumed over time via social media.

2.6 Data collection and analysis

Data were collected using questionnaires and were analyzed using descriptive statistics, correlation, regression and bootsrap analysis. Baron and Kenny (1986) mediation testing approach was used to test for mediation. Further, the medgraph was used to graphically analyze mediation effects. The findings were confirmed using structural equation modeling techniques.

3. FINDINGS

3.2 Level of education

Descriptive statistics were used to examine respondents' level of education. Table 1 presents the results.

Table 1: Level of education

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Primary	8	2.2	2.2	2.2
	Secondary	12	3.4	3.4	5.6
	Certificate	35	9.8	9.8	15.4
	Diploma	40	11.2	11.2	26.5
	Bachelors	120	33.5	33.5	60.1
	Masters	132	36.9	36.9	96.9
	PhD	11	3.1	3.1	100
	Total	**358**	**100**	**100**	

Results in Table 1 show that most respondents had master's degrees (Freq=132, 37%), followed by those with bachelors' degrees (freq=120, 34%). Those with diplomas were 40 (11%), those with certificates were 35 (10%), while those with secondary level education were 12(3%). Only 11(3%) respondents were PhD level while 8 (2%) were primary school level educated.

3.3 Marital status

Descriptive statistics were also used to examine the marital status of respondents as seen in Table 2.

Table 2: Marital status

	Frequency	Percent	Valid Percent	Cumulative Percent

Valid	Single	204	57	57	57
	Married	143	39.9	39.9	96.9
	Divorced	11	3.1	3.1	100
	Total	358	100	100	

Results in Table 2 show that most respondents were single (freq=204, 57%), followed by those who were married (freq=143, 40%). Only 11(3%) respondents were divorced.

3.4 Testing for Mediation

The objective of this study was to examine the mediation effect of External Locus of Control, Internal Locus of Control, Self-Regulation, and Behavioral Intention in the relation between Cognitive Factors and Health Behavior of social media users in Sub-Sahara Africa. In order to investigate this objective, six hypotheses were formulated. Baron and Kenny (1986) procedure was used to test for mediation. Thereafter, the results were entered in Jose (2013) Medgraphs to graphically produce mediation by Sobel z values, P values, direct and indirect effects. The following section presents mediation results:

H1: *Internal Locus of Control and Behavioral Intention mediate the relationship between Cognitive Factors and Health Behavior of social media users in Sub-Sahara Africa.*

Since this hypothesis had two mediators, it was skipped because Baron and Kenny procedure does not cater for two variable mediations (Jose, 2013; Baron & Kenny, 1986). The mediation effects of the hypothesis were tested using SEM Bootstrap mediation effects as will be seen later under Confirmatory analysis using structural equation modeling.

H2: *Self-Regulation mediates the relationship between Cognitive Factors and External Locus of Control of social media users in Sub-Sahara Africa.*

Baron and Kenny (1986) procedure was used to test for mediation of effect of Self-Regulation in the relationship between Cognitive Factors and External Locus of Control. Jose (2013) MedGraph was used to graphically produce mediation by Sobel z values, P values, direct and indirect effects as seen in Figure 1 Medgraph.

Type of mediation		Significant		
Sobel z-value		2.045447	*p* =	0.040811
95% Symmetrical Confidence interval				
	Lower	**0.00103**		
	Higher	**0.04826**		
Unstandardized indirect effect				
	a*b	**0.02464**		
	se	**0.01205**		

Effective Size measures

Standardised Coefficients		R^2 Measures (Variance)
Total:	**0.089**	**0.093**
Direct:	**0.276**	**0.076**
Indirect:	**0.03**	**0.017**
Indirect to Total ratio	**0.338**	**0.187**

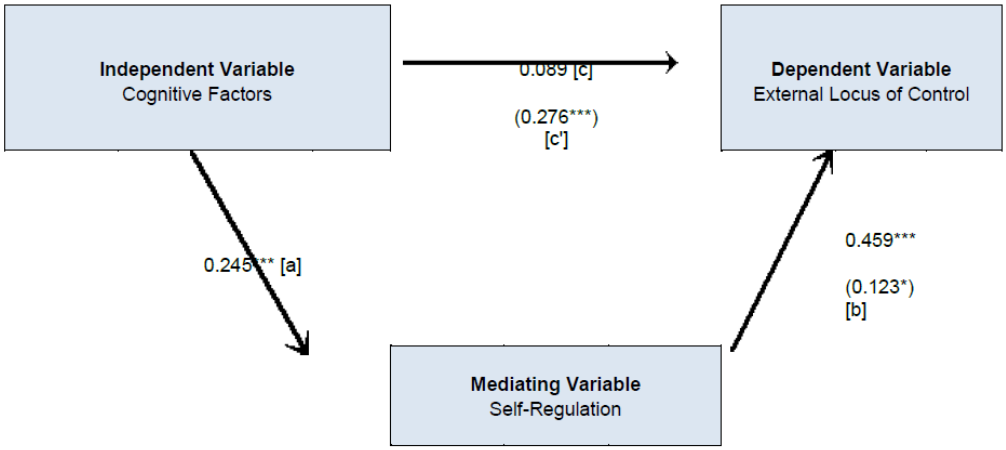


Figure 1: MedGraph for Self-Regulation in Cognitive Factors and External Locus of Control

The results presented in Figure 1 above reveal that Self-Regulation partially mediates the relationship between Cognitive Factors and External Locus of Control (Sobel z-value=2.05, P=0.040811). The mediation is significant at 95% confidence level. For there to be mediation, P value must be less than 0.05 (Jose, 2013; Baron and Kenny, 1986). Both lower and upper bound values are above zero, implying significance. Further, the indirect path from Cognitive factors to External Locus of Control contributes 33.8% of the total mediation effects. The variance explained by the Self-Regulation in the relationship between Cognitive Factors and External Locus Control is 18.7% (R^2=0.187). With these results therefore, H2 stating that Self-Regulation mediates the relationship between Cognitive Factors and External Locus of Control of social media users in Sub-Sahara Africa was supported.

H3: *External Locus of Control mediates the relationship between Self-Regulation and Health Behavior of social media users in Sub-Sahara Africa.*

Baron and Kenny (1986) procedure together with Jose (2013) Medgraph were used to test for mediation of effect of External Locus of Control in the relationship between Self-Regulation and Health Behavior as seen in Figure 2 Medgraph.

Type of mediation		Significant	
Sobel z-value		3.062629	*p* = 0.002194
95% Symmetrical Confidence interval			
	Lower	**0.03174**	
	Higher	**0.14459**	
Unstandardized indirect effect			
	a*b	**0.08816**	
	se	**0.02879**	

Effective Size measures

Standardised Coefficients		R^2 Measures (Variance)
Total:	**0.443**	**0.195**
Direct:	**0.365**	**0.104**
Indirect:	**0.077**	**0.090**
Indirect to Total ratio	**0.175**	**0.464**

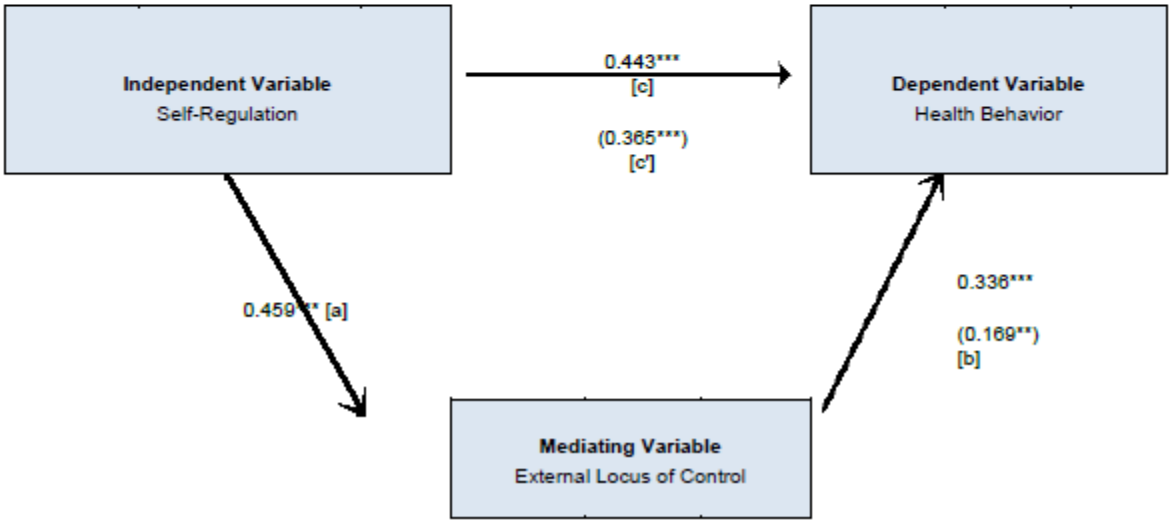


Figure 2: External Locus of Control mediating Self-Regulation and Health Behavior

The results presented in Figure 2 above reveal that External Locus of Control partially mediates the relationship between Self-Regulation and Health Behavior (Sobel z-value=3.062629, P=0.002194). Both direct and indirect effects are significant. Also, both lower and upper bounds are above zero, indicating significance. This mediation is significant at 95% confidence level. The indirect path from Self-Regulation to Health Behavior contributes 17.5% of total effects. Further, the indirect path explains 46.4% of variance in

total effects (R^2=0.464). According to Jose (2013) and Baron and Kenny (1986), there is mediation if P<= 0.05. Therefore, H3 stating that External Locus of Control mediates the relationship between Self-Regulation and Health Behavior of social media users in Sub-Sahara Africa was supported.

H4: *Self-Regulation mediates the relationship between Cognitive Factors and Health Behavior of social media users in Sub-Sahara Africa.*

Baron and Kenny (1986) procedure together with Jose (2013) Medgraph were used to test for mediation of effect of Self-Regulation in the relationship between Cognitive Factors and Health Behavior as seen in Figure 3 Medgraph.

Type of mediation		Significant		
Sobel z-value		4.138678	*p* =	0.000035
95% Symmetrical Confidence interval				
	Lower	**0.06668**		
	Higher	**0.18666**		
Unstandardized indirect effect				
	a*b	**0.12667**		
	se	**0.03061**		
Effective Size measures				
Standardised Coefficients			R² Measures (Variance)	
Total:		**0.194**	**0.037**	
Direct:		**0.091**	**0.007**	
Indirect:		**0.102**	**0.029**	
Indirect to Total ratio		**0.53**	**0.789**	

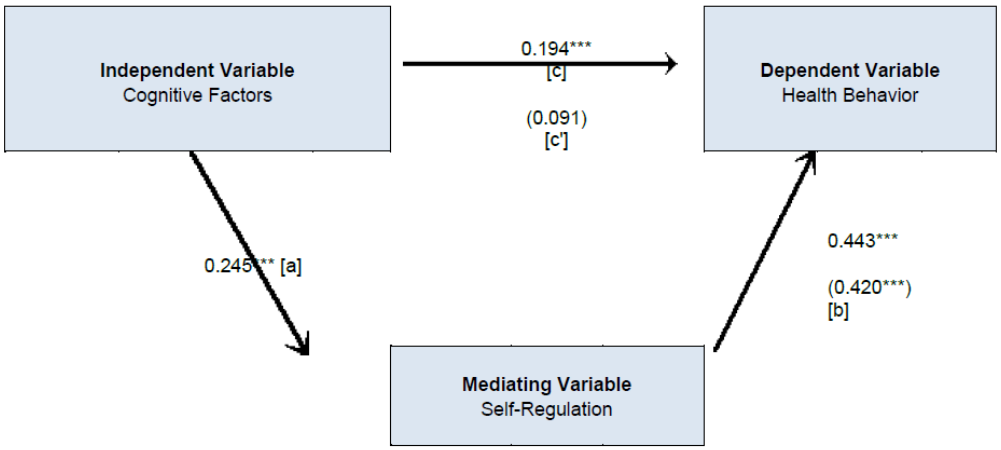


Figure 3: MedGraph Self-Regulation in Cognitive Factors and Health Behavior

The results presented in Figure 3 above reveal that Self-Regulation fully mediates the relationship between Cognitive Factors and Health Behavior (Sobel z-value=4.1838678, P=0.000035). This is because the direct

effect is not significant (Beta=0.091). This mediation is significant at 95% confidence level. Both lower and upper bounds are above zero, indicating significance. The indirect path from Cognitive factors to Health Behavior contributes 53% of total effects. Further, the indirect path explains 78.9% of variance in total effects (R^2=0.789). For there to be mediation, P value must be less than 0.05 (Jose, 2013; Baron and Kenny, 1986). Therefore, H4 was supported.

H5: *External Locus of Control mediates the relationship between Cognitive Factors and Health Behavior of social media users in Sub-Sahara Africa.*

Baron and Kenny (1986) procedure was used to test for mediation of effect of External Locus of Control in the relationship between Cognitive Factors and Health Behavior as seen in Figure 4 Medgraph.

Type of mediation		Null	
Sobel z-value		1.619432	*p* = 0.105354
95% Symmetrical Confidence interval			
	Lower	**-0.00741**	
	Higher	**0.07784**	
Unstandardized indirect effect			
	a*b	**0.03522**	
	se	**0.02175**	
Effective Size measures			
Standardised Coefficients			R^2 Measures (Variance)
Total:		**0.194**	**0.037**
Direct:		**0.166**	**0.027**
Indirect:		**0.028**	**0.010**
Indirect to Total ratio		**0.147**	**0.281**

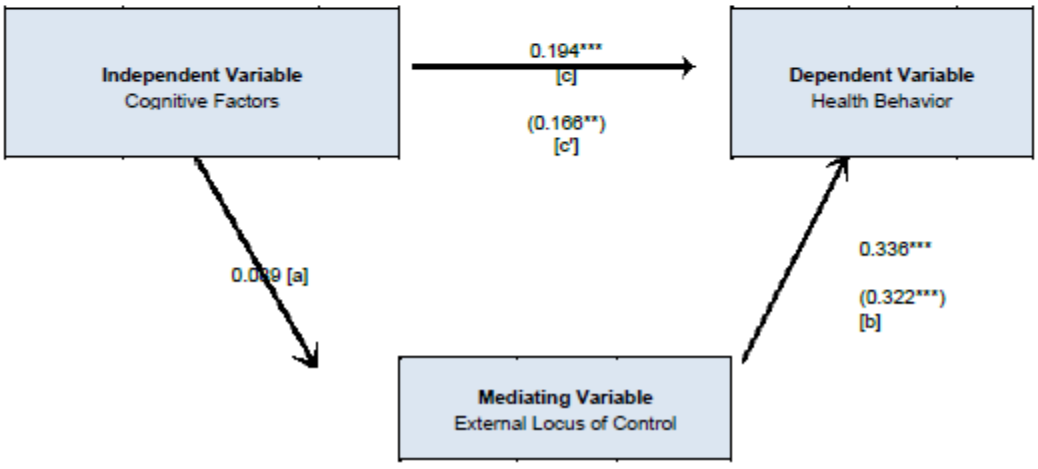


Figure 4: Medgraph External Locus of Control in Cognitive Factors and Health Behavior

The results presented in Figure 4 above reveal that External Locus of Control does not mediate the relationship between Cognitive Factors and Health Behavior (Sobel z-value=1.619432, P=0.105354). This is because Sobel z-value P of 0.105354 is above 0.05 (Jose, 2013; Baron & Kenny, 1986). Therefore, H5 stating that External Locus of Control mediates the relationship between Cognitive Factors and Health Behavior of social media users in Sub-Sahara Africa was rejected.

H6: *Self-Regulation mediates the relationship between Age Sensitivity and Health Behavior of social media users in Sub-Sahara Africa.*

Baron and Kenny (1986) procedure was used to test for mediation effect of Self-Regulation in the relationship between Age Sensitivity and Health Behavior as seen in Figure 5 Medgraph.

Type of mediation		Significant	
Sobel z-value		5.967725	*p* = <0.000001
95% Symmetrical Confidence interval			
	Lower	**0.09238**	
	Higher	**0.18275**	
Unstandardized indirect effect			
	a*b	**0.13757**	
	se	**0.02305**	
Effective Size measures			
Standardised Coefficients			R^2 Measures (Variance)
Total:		**0.226**	**0.051**
Direct:		**0.046**	**0.001**
Indirect:		**0.18**	**0.049**
Indirect to Total ratio		**0.799**	**0.967**

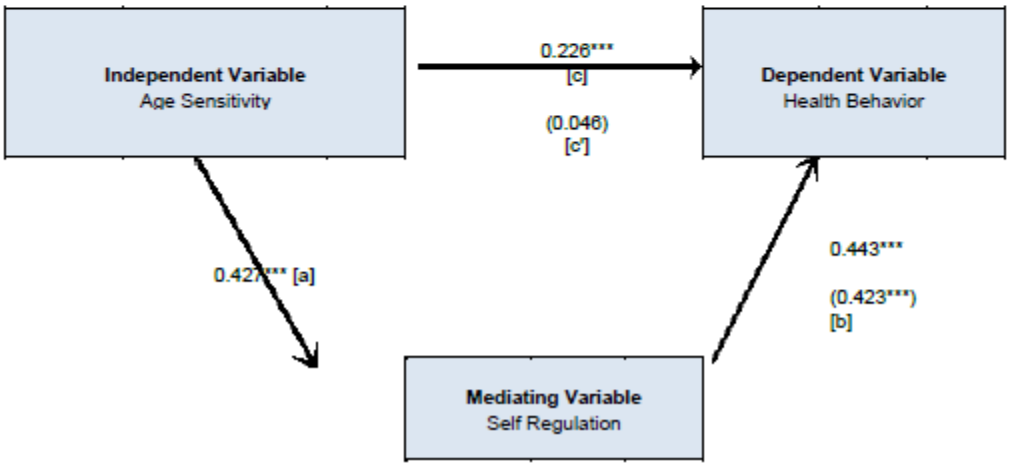


Figure 5: Medgraph Self-Regulation in Age Sensitivity and Health Behavior

The results presented in Figure 5 above reveal that Self-Regulation fully mediates the relationship between Age Sensitivity and Health Behavior (Sobel z-value=5.987725, P=0.000001). This is because Sobel z-value P of 0.000001 is less than 0.05 (Jose, 2013; Baron and Kenny, 1986). The direct effect is not significant (Beta=0.046). The path of Age sensitivity and Health behavior contributes 79.9% of total effects. Further, variables along the indirect path explain 96.7% of variance in the total effects (R^2=96.7%). Therefore, H6 stating that Self-Regulation mediates the relationship between Age Sensitivity and Health Behavior of social media users in Sub-Sahara Africa was supported. Table 68 presents a summary of chapter five.

3.5 Confirmatory analysis using Structural equation modeling

In order to test for hypotheses 1 to 6, mediation tests were run using structural equation modeling techniques. This is done through analyzing the direct and indirect effects and their significance levels by running the AMOS bootstrap procedure. The mediation effects are as presented in Table 3.

Table 3: Bootstrap Mediation effects

Dependent variable		Mediating variable		Independent variable	DE	P	IE	P	Mediation effect	Hypothesis
Health Behavior	<---	Internal Locus of Control and Behavioral Intention	<---	Cognitive Factors	.152	.019	.008	.026	Partial mediation	H1
External Locus of Control	<---	Self-Regulation	<---	Cognitive Factors	-.060	.433	.121	.001	Full mediation	H2
Health Behavior	<---	External Locus of Control	<---	Self-Regulation	.329	.001	.142	.001	Partial mediation	H3
Health Behavior	<---	Self-Regulation	<---	Cognitive Factors	.135	.069	.158	.001	Full mediation	H4
Health Behavior	<---	External Locus of Control	<---	Cognitive Factors	.262	.001	.031	.454	No mediation	H5

H1: *Internal Locus of Control and Behavioral Intention mediate the relationship between Cognitive Factors and Health Behavior of social media users in Sub-Sahara Africa.*

Results in Table 3 show that the direct effect of the relationship between Cognitive Factors and Health Behavior was significant (Beta=.152, P=.019). At the same time, the indirect effect of the relationship between Cognitive Factors and Health Behavior was also significant (Beta=.008, P=.026). Given that both the direct and indirect effects were significant, there is partial. This implies that Internal Locus of Control and Behavioral Intention mediate the relationship between Cognitive Factors and Health Behavior of social media users in Sub-Sahara Africa. Hence H1 was supported.

H2: *Self-Regulation mediates the relationship between Cognitive Factors and External Locus of Control of social media users in Sub-Sahara Africa.*

Results in Table 3 reveal that the direct effect of the relationship between Cognitive Factors and External Locus of Control is not significant (Beta=-.060, P=.433). The results however show that the indirect relationship between Cognitive Factors and External Locus of Control was significant (Beta=.121, P=.001). This means that there is full mediation of Self-Regulation in the relationship between Cognitive Factors and External Locus of Control. Since the introduction of Self-Regulation in the relationship renders the direct effect insignificant, it can be concluded that Self-Regulation fully mediates the relationship between Cognitive Factors and External Locus of Control. Therefore, H2 was supported.

H3: *External Locus of Control mediates the relationship between Self-Regulation and Health Behavior of social media users in Sub-Sahara Africa.*

As seen in Table 3, the direct effect of the relationship between Self-Regulation and Health Behavior was significant (Beta=.329, P=.001). The direct effect of the relationship between Self-Regulation and Health Behavior via External Locus of Control was also significant (Beta=.142, P=.001). This is in-line with H3 that External Locus of Control mediates the relationship between Self-Regulation and Health Behavior of social media users in Sub-Sahara Africa.

H4: *Self-Regulation mediates the relationship between Cognitive Factors and Health Behavior of social media users in Sub-Sahara Africa.*

Further, in Table 3 the results show that the relationship between Cognitive Factors and Health Behavior direct effect was not significant (Beta=.135, P=.069). However, the relationship between Cognitive Factors and Health Behavior via Self-Regulation was significant (Beta=.158, P=.001). This means that Self-Regulation fully mediates the relationship between Cognitive Factors and Health Behavior. Thus, H4 that stated that Self-Regulation mediates the relationship between Cognitive Factors and Health Behavior of social media users in Sub-Sahara Africa was supported.

H5: *External Locus of Control mediates the relationship between Cognitive Factors and Health Behavior of social media users in Sub-Sahara Africa.*

Results in Table 3 reveal that direct effect of the relationship between Cognitive Factors and Health Behavior was significant (Beta=.262, P=.001). However, the indirect effect of the relationship between Cognitive Factors and Health Behavior via External Locus of Control was not significant (Beta=.031, P=.454). This means that External Locus of Control does not mediate the relationship between Cognitive Factors and Health Behavior via External Locus of Control. Therefore, H5 which stated that External Locus of Control mediates the relationship between Cognitive Factors and Health Behavior of social media users in Sub-Sahara Africa was rejected.

4. DISCUSSION OF FINDINGS

4.2 The mediation effect of Internal Locus of Control and Behavioral Intention in the relationship between Cognitive Factors and Health Behavior of social media users

Findings revealed that Internal Locus of Control and Behavioral Intention mediated the relationship between Cognitive Factors and Health Behavior of social media users. Whereas there was a negative significant relationship between Cognitive Factors and Health Behavior, the introduction of Internal Locus of Control and Behavioral Intention as mediators also yielded a positive significant relationship between Cognitive Factors and Health Behavior. This meant that Internal Locus of Control and Behavioral Intention enhanced the relationship between Cognitive Factors and Health Behavior.

The above finding resonates to Rotter (1966) theory that argues that individuals who control the consequences of their actions, exhibit high interpersonal relations, and make greater efforts to learn, if knowledgeable and possesses strong beliefs, they are likely to learn new Health Behaviors via social through observational learning and practice. Further, the finding is in agreement with Venkatesh et al. (2003) that Behavioral Intention facilitates behavioral learning.

4.3 The mediation effect of Self-Regulation in the relationship between Cognitive Factors and External Locus of Control of social media users

Sobel test z-value results revealed that Self-Regulation significantly mediated the relationship between Cognitive Factors and External Locus of Control. SEM findings also indicated that Self-Regulation had a partial positive mediation effect on the relationship between Cognitive Factors and External Locus of Control. Meanwhile the relationship between Cognitive Factors and External Locus of Control was negative. The introduction of Self-Regulation as a mediator created a positive relationship between Cognitive Factors and External Locus of Control which was previously negative via direct path. Hence, where there is no Self-Regulation, an increase in Cognitive Factors reduced External Locus of Control of social media users which is in contravention with Boundless (2016) and Rotter (1966).

However, once Self-Regulation is introduced as a mediator, the indirect relationship between Cognitive Factors and External Locus of Control through Self-Regulation becomes positive – implying that an increase in Cognitive Factors as well as Self-Regulation also increases External Locus of Control of social media users.

This confirms the literature that argues that Cognitive Factors improve External Locus of Control (Boundless, 2016 & Rotter, 1966).

4.4 The mediation effect of External Locus of Control in the relationship between Self-Regulation and Health Behavior of social media users

Findings divulged a partial mediation effect caused by External Locus of Control in the relationship between Self-Regulation and Health Behavior implying that social media users' tendency of relying on online communities for learning new behaviors, facilitated the level of carefulness and control they had in the process of learning new Health Behaviors via social media. This finding is in-line with literature of (Blalock et al. 2016; Boundless, 2016; Kane, 2004; Winett et al. 1999; Bandura, 1988; 1986; Rotter, 1966)

Individuals with high Self-Regulation learn selectively. They control the consequences of their actions and are likely to access information from trusted sources. Therefore, introducing External Locus of Control helps to ease up Self-Regulation in the learning. An individual becomes more open to various sources of information via social media. According to Boundless (2016), an individual with External Locus of Control seeks solutions to his / her problems from people surrounding him / her. In this case social media users with External Locus of Control tend to ask for counseling and guidance from online communities about their problems. This helps them get solutions which if practiced, gradually change their Health Behaviors.

4.5 The mediation effect of Self-Regulation in the relationship between Cognitive Factors and Health Behavior of social media users

Sobel test z-value results revealed that Self-Regulation significantly mediated the relationship between Cognitive Factors and Health Behavior. SEM findings also revealed that Self-Regulation mediated the relationship between Cognitive Factors and Health Behavior. This finding helps to suggest that social media users who set goals, freely discussed their health issues via social media, and were in control of their health affairs were likely to learn new Health Behaviors if they were knowledgeable and had strong beliefs in their culture and religious norms. This finding was in-line with literature (Blalock et al. 2016; Bayrón, 2013; Kane 2004; Bandura, 1988; 1986).

The learning of new Health Behavior through observation and practice can be attributed to social media users' knowledge, beliefs as well as their level of Self-Regulation. Individuals with strong beliefs, good knowledge, and control their actions are likely to learn new useful health related behaviors. This can also happen if an individual is freer to handle their health-related problems via social media.

4.6 The mediation effect of External Locus of Control in the relationship between Cognitive Factors and Health Behavior of social media users

Sobel test z-value results revealed that External Locus of Control did not significantly mediate the relationship between Cognitive Factors and Health Behavior. Whereas there was a significant relationship between Cognitive Factors and Health Behavior in SEM, an introduction of External Locus of Control revealed that

the relationship became positive and significant. This finding indicated that External Locus of Control helped to mediate the relationship between Cognitive Factors and Health Behavior of social media users. This finding supports the literature arguing that knowledgeable individuals who were in control of their actions during online engagements were better learners of new Health Behaviors (Blalock et al. 2016; Bayrón, 2013). The findings also support an argument that knowledgeable individual with strong beliefs who seek solutions to their health problems from online communities learned new Health Behaviors (Boundless, 2016; Rotter, 1966).

4.7 The mediation effect of Self-Regulation in the relationship between Age Sensitivity and Health Behavior of social media users

Sobel test z-value results revealed that Self-Regulation significantly mediated the relationship between Age Sensitivity and Health Behavior. Whereas it was revealed that Age Sensitivity had a negative significant relationship with Health Behavior in SEM, an introduction of Self-Regulation as a mediator in this relationship caused it to become positive and significant. This finding suggests that without Self-Regulation in terms of self-control, self-management and being charge of one's affairs, social media users who are age sensitive were unlikely to learn. However, those social media users who minded the age groups of online platforms where health related information emanated from and were in charge of their actions in online engagements were likely to learn new Health Behaviors. This finding is in-line with NIHCE (2007) and WHO (2000) who acclaim the role played by age in affecting the learning process. Age Sensitivity can delay or speedup the learning process. In this case for example, we discover that Age Sensitivity delays learning where there is no self- regulation (Blalock et al. 2016; Bayrón, 2013).

5. CONCLUSION AND RECOMMENDATIONS

The objective of this study sought to examine the mediation effect of External Locus of Control, Internal Locus of Control, Self-Regulation, Age sensitivity and Behavioral Intention in the relationship between Cognitive Factors and Health Behavior of social media users in Sub-Sahara Africa. This was digested into six hypotheses including H1, H2, H3, H4, H5 and H6.

Findings supported H1 that Internal Locus of Control and Behavioral Intention partially and mediated the relationship between Cognitive Factors and Health Behavior. Given this finding, we conclude that Internal Locus of Control and Behavioral Intention mediate the relationship between Cognitive Factors and Health Behavior of social media users in Sub-Saharan Africa.

The findings also supported H2 since Self-Regulation fully mediated the relationship between Cognitive Factors and External Locus of Control. Therefore, we conclude that Self-Regulation fully mediates the relationship between Cognitive Factors and External Locus of Control of social media users in Sub-Saharan Africa.

On H3, the finding revealed that Self-Regulation and External Locus of Control mediated the relationship between Self-Regulation and Health Behavior. this leads us to a conclusion that Self-Regulation and External

Locus of Control mediate the relationship between Self-Regulation and Health Behavior of social media users in Sub-Saharan Africa.

Findings also supported H4 where Self-Regulation was found to mediate the relationship between Cognitive Factors and Health Behavior. Therefore, we conclude that Self-Regulation mediates the relationship between Cognitive Factors and Health Behavior of social media users in Sub-Saharan Africa.

Further, H5 was supported whereby External Locus of Control mediated the relationship between Cognitive Factors and Health Behavior. This finding leads us to a conclusion that External Locus of Control mediates the relationship between Cognitive Factors and Health Behavior of social media users in Sub-Saharan Africa.

Finally, on H6, although both direct and indirect effects were significant suggesting partial mediation, the direct effect was negative while indirect effect was positive. This implied that Self-Regulation as a mediator transformed a negative relationship to positive. Therefore, H6 was also supported that Self-Regulation mediated the relationship between Age Sensitivity and Health Behavior of social media users in Sub-Sahara Africa.

Lastly, given that both of the mediator variables mediated their respective relationships, it is pertinent that these mediators including Self-Regulation and External Locus of Control are enhanced in order to promote positive Health behavioral change via social media platforms.

References

Abbasi M., Chai S., Liu H., and Sagoo K. (2016) Real-World Behavior Analysis through a SM Lens, *Arizona State University.* Retrieved on 26th March 2016 from: http://www.public.asu.edu/~mabbasi2/papers/SBP12Lens.pdf

Adewuyi E. O. and Adefemi, K. (2016) Behavior Change Communication Using Social Media: A Review, *The International Journal of Communication and Health*, 2016 / No. 9

Blalock S. J., Bone L., Brewer N. T., Butterfoss F. D., Champion V. L., Epstein R. E., … (2016) Health Behavior and Health education: Theory, Research and Practice. Karen G., Rimer B. K., Viswanath K. (Ed.), Perelman School of Medicine, University of Pennsylvania, Retrieved on March 3rd 2016 from: http://www.med.upenn.edu/hbhe4

Bandura, A. (1990). Mechanisms of moral disengagement. In W. Reich (Ed.), Origins of terrorism: Psychologies, ideologies, theologies, states of mind (pp. 161-191). *Cambridge: Cambridge University Press*.

Bandura, A. (1986). Social foundations of thought and action: A social cognitive theory. Englewood Cliffs, NJ: Prentice-Hall.

Bayrón, C.E (2013) Social Cognitive Theory, Entrepreneurial Self-Efficacy and Entrepreneurial Intentions: Tools to Maximize the Effectiveness of Formal Entrepreneurship Education and Address the Decline in Entrepreneurial Activity, *Revista Griot*. Vol. 6, 1, Pg. 66-77

Boundless (2016). Bandura's and Rotter's Social-Cognitive Theories of Personality, *Boundless Psychology,* Boundless, 08 Jan. 2016. Retrieved 21 Mar. 2016 from https://www.boundless.com/psychology/textbooks/boundless-psychology-textbook/personality-16/social-cognitive-perspectives-on-personality-81/bandura-s-and-rotter-s-social-cognitive-theories-of-personality-314-12849/

Boyar, R., Levine, D., and Zensius, N. (2011) Tech SexUSA: Youth Sexuality and Reproductive Health in the Digital Age, *ISIS.*

Carroll, J.A. and Kirkpatrick, R.L. (2011) Impact of social media on adolescent behavioral health, *Oakland, CA: California Adolescent Health Collaborative.*

Centola, D. (2013) Social Media and the Science of Health Behavior, *American Heart Association*

Centola D (2010) The spread of behavior in an online social network experiment, *Science*. 329: 1194–1197.

Cui P. (2016) Behavioral Analysis and Prediction in Social Networks, Tsinghua University. Retrieved on 26th March 2016 from: http://centres.smu.edu.sg/larc/files/2013/03/Peng_Cui_slides.pdf

Dretske F. (2016) Epistemology and Information, *UVA,* retrieved on 19th July 2016 from http://www.illc.uva.nl/HPI/Draft_Epistemology_and_Information.pdf

Hilliard C. (2012). SM for Healthcare: A Content Analysis of M.D. Anderson's Facebook Presence and its Contribution to Cancer Support Systems, *The Elon Journal of Undergraduate Research in Communications,* Vol. 3, No. 1

Hyde S. K. (2017) Math 221: Confidence Intervals for a Population Proportion Chapter 19,

(Moore, 5th Ed.), *Brigham Young University,* retrieved on 30th April, 2017 from http://jekyll.math.byuh.edu/courses/m221/handouts/handout19_prop_ci.pdf

IGI (2016) What is Positivist Epistemology, *IGI,* retrieved on August 7th 2016 from http://www.igi-global.com/dictionary/positivist-epistemology/23062

Internet World Statistics (2015) Africa 2015 population and internet users' statistics for 2015, *Internet World Statistics*, Retrieved on 26 March, 2016 from: http://www.internetworldstats.com/stats1.htm

Kane RL, Johnson PE, Town RJ, Butler M. A, (2004) Structured Review of the Effect of Economic Incentives on Consumers 'Preventive Behavior, *American Journal of Preventive Medicine* 27:4, 327-352

Korda, H., and Itani, Z. (2011) Harnessing Social Media for Health Promotion and Behavior Change, *Health Promotion Practice*, Sage Journals, Vol 14, Issue 1, 2013

Newbold, K. B. and Campos. S. (2011) Media and Social Media in Public Health Messages: A Systematic Review, *McMaster Institute of Environment & Health*

NIHCE (2007) Behaviour change at population, community and individual levels, *National Institute for Health and Clinical Excellence*

PWC Health Research Institute (2012) SM "likes" healthcare from marketing to social business, *PWC*

Rideout, V.J., Foehr, U.G., and Roberts, D.F. (2010) Generation M2: Media in the lives of 8-18 year olds, *Kaiser Family Foundation*. Retrieved on April 30th 2017 from http://www.kff.org/entmedia/upload/8010.pdf

Rotter, J. B. (1993). Expectancies. In C. E. Walker (Ed.), The history of clinical psychology in autobiography (vol. II) (pp. 273-284). *Pacific Grove,* CA: Brooks/Cole

Rouse M. (2014) ICT (Information and Communications Technology - Or Technologies), TechTarget, Retrieved On 26 March, 2016 From: Http://Searchcio.Techtarget.Com/Definition/Ict-Information-And-Communications-Technology-Or-Technologies

Salathé, M. Vu D. Q. Khandelwal, S. and Hunter. D. R. (2017) The Dynamics of Health Behavior Sentiments on a Large Online Social Network, *Penn State University*

Smith K, Christakis N. (2008) Social networks and health. *Annu Rev Sociol*, 34:405–429.

Statistics solution (2016) Moderator variable, retrieved on 7th March 2016 at https://www.statisticssolutions.com/directory-of-statistical-analyses-general-moderator-variable/

Tennis. J. T. (2008) Epistemology, Theory, and Methodology in Knowledge Organization: Toward a Classification, Metatheory, and Research Framework, *In Knowledge Organization,* 35(2/3): 102-112.

Venkatesh V., Morris, M. G., Davis, G. B., and Davis. D. (2003) User Acceptance of Information Technology: Toward a Unified View, *MIS Quarterly.* Vol. 27, No. 3, pp. 425-478

WHO (2000) Health and Health Behaviour among Young People, *World Health Organization Policy* Series: Health policy for children and adolescents Issue 1; International Report

Wikipedia (2016a) Genetic epistemology, *Wikipedia,* retrieved on August 7th 2016 from https://en.wikipedia.org/wiki/Genetic_epistemology

Wikipedia (2016b) Feminist epistemology, Wikipedia, retrieved on August 7th 2016 from https://en.wikipedia.org/wiki/Feminist_epistemology

Wikipedia (2016c) Social epistemology, Wikipedia, retrieved on August 7th 2016 from https://en.wikipedia.org/wiki/Social_epistemology

Wikipedia (2016d) Constructivist epistemology, Wikipedia, retrieved on August 7th 2016 from https://en.wikipedia.org/wiki/Constructivist_epistemology

Winett R. A., Anderson E. S., Whiteley J. A., Wojcik J. R., Rovniak L. S., Graves K. D., Galper D. I., Winett S. G. (1999) Church-based Health Behavior programs: Using Social Cognitive Theory to formulate interventions for at-risk populations, *Applied & Preventive Psychology* 8:129-142.

Winters E, Petosa R, Charleton T. (2003) Using Social Cognitive Theory to explain discretionary "Leisure-time" physical exercise among high school students. Journal of Adolescent Health Vol. 32:436-442.

Wright, K. (2016) Social Networks, Interpersonal Social Support, and Health Outcomes: A Health Communication Perspective. *Frontiers in Communication*, 1:10. doi: 10.3389/fcomm.2016.00010