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Social Control of Trolling and Flaming Behaviors among Iranian Users: A Non-Recursive Model

Shalaleh Meraji Oskuie[1]
Department of Media Management, Faculty of Management and Economics, Tehran Science and Research Branch, Islamic Azad University, Tehran, Iran
Kamran Mohamadkhani[2]
Department of Higher Education Administration, Faculty of Management and Economics, Tehran Science and Research Branch, Islamic Azad University, Tehran, Iran
Ali Delavar[3]
Department of Psychometrics, Faculty of Psychology and Educational Sciences, Allameh Tabataba'i University, Tehran, Iran
Ali Akbar Farhangi[4]
A Faculty of Management, University of Tehran, Tehran, Iran

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Abstract: *The current quantitative study aimed at examining the effects of Low Self-Control, Negative Interpersonal Relationships, and Depression on social control of trolling and flaming behaviours among Iranian users. A self-made questionnaire which went through validity and reliability assessment, was administered, and 989 participants filled it out. After conducting confirmatory factor analysis, and validity assessment of the measurement model, a full latent variable model was drawn up employing Maximum Likelihood estimation, and Bootstrap. The model was non-recursive as Low Self-Control, Negative Interpersonal Relationships, and Depression variables were non-recursive and had reciprocal relationships. The results showed that Low Self-Control increases Trolling/ Flaming Behaviours, and also Depression, and Negative Interpersonal Relationships. Low Self-Control acts as a mediator between Depression and Trolling/ Flaming Behaviours, and also between Negative Interpersonal Relationships and Trolling/ Flaming Behaviours through Depression. The results also demonstrated that Depression has no direct effect on Trolling/ Flaming Behaviours, but it has an indirect effect through Low Self-Control, on Trolling/ Flaming Behaviours. Negative Interpersonal Relationships have also no direct effect on Trolling/ Flaming Behaviours, but they have an indirect effect through Depression, and Low Self-Control, on Trolling/ Flaming Behaviours. The important contribution of the current study is the recognition of the role of self-control as a mediator among examined variables. The findings of this study can be employed to devise new policies and initiatives to socially control the Trolling/ Flaming Behaviours, without applying coercion.*

Keywords: *Social Control; Trolling; Flaming; Low Self-control; Depression; Negative Interpersonal Relationships; Cybercultural Transgressions.*

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Introduction

State-of-the-art communication technologies have changed the face of today's societies. Despite all the undeniable benefits, computer-mediated communication (CMC) has raised some nonnegligible complications. Transgressions (i.e., non-normative behaviors) and misconducts have manifested themselves through an environment characterized by ease of communication (Reyns, 2010, p. 99), and through a space secured vaguely by anonymity (Hardaker, 2010, p. 215). Hence, the web has prepared a ground for "malicious users" (e.g., trolls and vandals) and "malicious information" (e.g., rumors and hoaxes) (Kumar, 2017, p. 2). Transgression or deviance is a behavior, attitude, or a state of being, that violates norms, underconforms or overconforms to norms, and is either negatively or positively evaluated and/or sanctioned (Heckert & Heckert, 2015, pp. 96-97). "Deviance – and reactions to deviance – are universal or pan-human phenomena; they occur in all societies, and in all social groupings in every society" (Heckert & Heckert, 2015, p. 15).

[1] Email: shalaleh.meraji@srbiau.ac.ir
[2] Email: k.kamran@srbiau.ac.ir (Corresponding Author)
[3] Email: delavarali@yahoo.com
[4] Email: dr_aafarhangi@yahoo.com

Transgressions and misconducts are diffused in different types and on different platforms in cyberspace. Excluding cybercrimes, some of cybercultural transgressions can be mentioned as follows: Trolling, flaming, cyber-vandalism, Internet addiction, reading others' emails, misuse of digital information, online sexual pushiness (Nevin, 2015, p. 78); impersonation or identity theft, misinformation, cyberbullying, plagiarism, spamming, clickbait, inappropriate contents (including pornography, vandalism, violence, gambling and etc.), witch hunting (a social trial on certain entity) (Ramingwong & Ramingwong, 2017, pp. 81-84), and Sockpuppetry (the usage of multiple accounts by the same user, often to deceive and manipulate others) (Kumar, Cheng & Leskovec, 2017, p. 947). To restrain and restrict probable harmful psychological, physical and financial consequences of cyber-transgressions, it is a necessity to socially control them. Thus, it is of a high importance for every society, to recognize effective social control means compatible with the inherent human traits, characteristics and contingencies of modern society, and attributes of new technologies.

To delimit the scope of the current study, trolling/ flaming behaviors were chosen from the variety of transgressive behaviors. Trolling is one of the online misconducts that many researchers have studied from different points of view (e.g.: Cheng, Bernstein, Danescu-Niculescu-Mizil, & Leskovec, 2017; Hallman & Lökk, 2016; Coles & West, 2016; Hardaker, 2015; Buckels, Trapnell & Paulhus, 2014; Bishop, 2014; Griffiths, 2014; Whelan, 2013; Hardaker, 2010). "Flaming is widely found in email, public newsgroups, discussion boards, and online video games" (Kou & Nardi, 2013, p. 616). Research on trolling and flaming behaviors on Iranian social media is rare. To the best knowledge of the authors, none of Iranian studies on cybercultural transgressions employed a social control perspective, and predictor variables such as self-control, depression, and interpersonal relationships, to study the issue. Hence, to fill the existing gap in the literature, the current study aimed at examining the effects of Low Self-Control, Depression, and Negative Interpersonal Relationships on social control of trolling and flaming behaviors among Iranian users. To this end, a non-recursive structural equation model was tested. In the following sections, theoretical foundations, literature review, and methodological issues are discussed. Then, statistical procedures for obtaining the results are elaborated in a detailed manner, and finally, conclusions, implications for practice and further research, and also, research significance and contributions are discussed.

Theoretical Foundations

Social Control of Transgressions

Transgression is a discursive behavior that violates, and goes across or beyond the limits, boundaries, and accepted practices, laws or conventions (Sara & Littlefield, 2014, p. 295; Cieślak & Rasmus, 2012, p. 85; Jenks, 2003, p. 3). The concept of transgression implies inclusion and exclusion, and a binary thought system (Jenks, 2003, p. 2). These types of dichotomies and continua are situation-specific and vary across social space, place, territory, and through time (Jenks, 2003, pp. 2-3; Cresswell, 1996, p. 166). "Transgression is not the same as disorder; it opens up chaos and reminds us of the necessity of order" (Jenks, 2003, p. 7). "Transgressions do not form their own orders. Boundaries are critiqued, not replaced" (Cresswell, 1996, p. 166). "Within cultural criminology transgression is used to explore the secret pleasure from crossing boundaries" (Penfold-Mounce, 2009, p. 4).

There is a difference between social deviance (violation of a cultural norm) and criminal deviance and transgression (violation of a formally enacted law) (Worthen, 2016, pp. 17-19). Émile Durkheim stated the function of the deviant behavior as "an integral part of all healthy societies", and argued that a social group becomes integrated and cooperated in the response to the deviant behavior (Tischler, n.d., p. 156). "Social control can be defined as the process by which individuals and societies attempt to prevent or reduce deviant conditions or their consequences, induce and monitor compliance with their major values and norms, and hence maintain social order and morality" (Dijker & Koomen, 2007, p. 4). Mechanisms of social control are crucial for every society and community, and are distinguished in two forms of internal means of control (individual's internalized norms, values and standards taught through socialization process) and external means of control (the reactions of others to individual's behavior, including rewards and punishments) (Tischler, n.d., pp. 158-159). These social control efforts can be exerted as formal social control (criminal justice system), or informal social control ("all the

interpersonal pressures and sanctions that individuals apply to people who violate social norms") (Goode, 2015, p. 7). Social control processes emerge naturally among the group members, and these control machines are embedded in the cultural production process (Musheno, Altheide, Zatz, Johnson & Hepburn, 1990, pp. 8-9). "Objects of control include thoughts, behaviours, predispositions or consequences that violate norms of behaviour" (Atchison, 2000, p. 87).

Trolling and Flaming Behaviors

Trolling is a malicious, deceptive, disruptive or disinhibited online behavior, and a vituperative discursive and interactional action without account, responsibility or any apparent instrumental purpose, that is intended to aggravate, annoy, harass or disrupt online interactions and communication, and to fool and provoke others by posting irrelevant and abusive, disruptive, false or offensive comments (Kumar, Cheng & Leskovec, 2017, p. 947; Coles & West, 2016, p. 2; Kovic, Rauchfleisch, & Sele, 2016, p. 7; Buckels, Trapnell & Paulhus, 2014, p. 1; Siersdorfer, Chelaru, San Pedro, Altingovde & NEJDL, 2014, p. 4; Whelan, 2013, p. 38). Trolling is a behavior of "luring others into often pointless and time-consuming discussions" by producing an intentionally false or incorrect utterance to elicit a particular response, generally a negative or a violent one from recipient (Griffiths, 2014, p. 85).

Trolling merges with other transgressive behaviors such as griefing (annoying online game players (Ldoceonline, n.d.)), swearing, or personal attacks (Cheng, Bernstein, Danescu-Niculescu-Mizil, & Leskovec, 2017, p. 2). Trolling also often merges with flaming (Griffiths, 2014, p.86). Flaming "refers to a message sender's hostile emotional expressions characterized by using insulting, profane, or offensive languages, which may 'inflict harm to a person or an organization resulting from uninhibited behavior'" (Cho & Kwon, 2015, p. 364). Whelan (2013) argued that trolling on forums can be considered as a threat to the public sphere, a ground for moral panic, and a risk to online media users, hence, it is a threat for democracy, legitimacy, rationality, common interest, and rational, fair collective deliberation (pp. 38-39).

"Internet trolling as a term has changed in meaning since it first entered mainstream use on the Internet in the 1990s"; The 1990s kind of trolling is called "classical trolling" which "is considered to be 'trolling for the Lolz' (i.e. positive)", and the 2010 kind is called "Anonymous trolling" which is "trolling for the Lulz" (i.e. negative) (Bishop, 2014, p. 155). "[T]he present Internet trolling can be divided into the so-called 'kudos trolling', the aim of which is, in particular, to amuse the Internet audience, and the so-called 'harm trolling', the aim of which is to harm Internet users", however, usually a combination of both types of trolling is observable (Kopecký, 2016, p. 2).

Trolls can be classified as follows: 1) "pseudo- naïve troller" (who intentionally seeks advice to provoke emotional responses, or disseminates poor or false advice pretending to be innocent and not aware that the advice is wrong) (Hardaker, 2010, pp. 228-229); 2) Griefers ("who try to ruin a gaming experience, often by team-killing or obstructing objectives" (Griffiths, 2014, p.86); 3) Sexist/ racist (Griffiths, 2014, p.86); 4) Spam troll (who sends unsolicited, impersonal, and irrelevant messages with an intent to provoke aggravated responses) (Hardaker, 2010, p. 233); and 5) Webcam troll (who misuses the web camera to attack the victim by showing them "pre-recorded video loop instead of the actual web camera picture") (Kopecký, 2016, p. 3). Cheng, Bernstein, Danescu-Niculescu-Mizil, Leskovec (2017, p. 1) demonstrated that rather than an antisocial minority, ordinary people can also be engaged in trolling behavior.

Theories of Transgression

Modern approaches to deviance and crime can be categorized into "biological, psychological, and sociological explanations"; Psychological theories of deviance can be divided to Psychoanalytic theory, Behavioral theories, and Crime as individual choice; Sociological theories of deviance can be mentioned as follows: Anomie theory (Émile Durkheim), Strain theory (Robert k. Merton), Control theory, Techniques of neutralization, Cultural transmission theory (Clifford Shaw and Henry Mckay), and Labeling theory (Edwin Lemert) (Tischler, n.d., pp. 160-166). In the following sections, General Strain Theory and Self-Control Theory are discussed.

General Strain Theory

Robert Agnew's General Strain Theory (GST) focuses on individuals' immediate social environments by examining three types of strainful experiences and strenuous life circumstances that may lead to negative, delinquent, and criminal behavior: The actual or anticipated 1) failure to achieve positively valued goals, 2) removal of positively valued stimuli, and 3) presentation of negative or noxious stimuli; When these tough events are considered as "unjust, greater in magnitude or size, and are more recent, longer in duration, and clustered in time, they are more likely to result in a range of negative emotions including anger, disappointment, despair, depression, and fear" (Worthen, 2016, pp. 53-54).

Agnew (2009) argued that Strains may increase crime for some reasons stated below: 1) "Strains Lead to Negative Emotional States"; 2)"Strains May Reduce [individual's level of] Social Control"; 3) "Strains May Foster the Social Learning of Crime" by exposing individuals to others who model and reinforce crime; 4) "Chronic [or repeated] Strains May Foster the Traits of Negative Emotionality and Low Constraint" (pp. 170-172).

Certain strains are conducive to crime, but others are not (Agnew, 2009, p. 172). Agnew (2001, 2006) developed a list of the specific strains that are predicted to be most conducive to crime, as follows: Parental rejection; erratic, excessive, and/or harsh supervision/discipline; child abuse and neglect; negative secondary school experiences; abusive peer relations; work in the secondary labor market; unemployment (especially being persistent and blamed on others); marital problems; the "failure to achieve selected goals, including thrills/excitement, high levels of autonomy, masculine status, and monetary goals"; criminal victimization; homelessness; residence in very poor urban communities; "discrimination based on characteristics such as race/ethnicity, gender, and religion" (Agnew, 2009, p. 174). In cyberspace, Peterson & Densley (2017) mentioned that online violence and aggression may "attract individuals with a distinct set of internalizing traits such as depression and [suicidal ideation] or shyness" (p. 196).

Self-Control Theory

Michael Gottfredson and Travis Hirschi's General Theory of Crime considered low self-control, and "the tendency to pursue immediate gratification at the expense of consideration for long-term consequences" as the major cause of crime regardless of its place in time, history, context, and types of criminal acts (Piquero, 2009, pp. 153-154). General Theory of Crime (1990) predicted that when (low) self-control mixes with the available crime opportunities, the antisocial and criminal activity probability will have a generally linear increase (Piquero, 2009, p. 153). Six dimensions of self-control are as follows: impulsivity, a preference for simple tasks, risk-seeking, preference for physical over mental activities, self-centeredness, and a bad or volatile temper (Worthen, 2016, p. 53; Piquero, 2009, pp. 153-154). Na and Paternoster (2012) mentioned five domains of self-control assessment as follows: "1) impulsivity, 2) hyperactivity, 3) concentration problems, 4) oppositional-defiant behavior, and 5) helplessness" (p. 14). Empirical research showed that opportunities moderate some aspects of the self-control-crime linkage (Piquero, 2009, p. 159).

Wikström and Treiber (2007) developed a very recent conceptualization of self-control, on the basis of Wikström's (2006) "situation action theory of crime"; Similar to the redefinition of self-control by Hirschi (2004), and its empirical operationalization by Piquero and Bouffard, Wikström and Treiber suggested that "self-control is best conceptualized as a situational concept (a factor in the process of choice) rather than as an individual characteristic as conceived in the general theory", and individual's crime engagement is "a question of their morality" rather than "their ability to exercise self-control" (Piquero, 2009, pp. 160-161). Tittle, Ward, and Grasmick (2004) developed a modified conceptualization of self-control, in terms of individual's capacity for self-control and their interest in exercising it (Piquero, 2009, p. 161). Aliverdinia, Memar & Nosratzehi (2015) argued that there are inverse correlations among self-control, religiousness, and deviant behaviors; but there is not any meaningful association between religiousness and self-control. Aliverdinia & Saleh Nejad (2012) showed that "three variations of self-control, diversion opportunity, and the gender of respondents have significant impacts on their participation in deviant behaviors. Self-control variation, among three other main variables in this research, stands as the strongest predictor of boys' and girls' deviant behaviors."

Li, Holt, Bossler & May (2016) examined the mediating effects of social learning on the low Self-Control—Cyberbullying, and showed that both low self-control and social learning measures were indicative of involvement in cyberbullying (p. 131). Higgins, Wolfe & Marcum (2008) showed a link between self-control and digital piracy.

Method

The aim of the current quantitative study was to develop an appropriate structural equation model for the factors affecting social control of Trolling/ Flaming Behaviors among Iranian users. To this end, a "Correlational Research Design" (Privitera, 2014) was adopted.

Sampling Method and Sample Size

The statistical population of the current research is Iranian Internet users. Iran had 67,602,731 Internet users as of 31 March, 2020 (Internetworldstats, 2020). Due to the largeness of population, "Convenience Non-Probability Sampling" method was employed, because assigning an equal chance of selection to each element of the population (probability sampling) was impossible. Walliman (2011) mentioned that non-probability sampling can be useful when it is difficult to get access to the whole population (p.96). An online questionnaire was filled out by 989 participants (964 in the final conduction, and 25 participants in the pilot study), of which 499 were male, and 490 were female, and around half of the participants (45%) were in the age range of 25-34 years. Due to the sample size of 989, the sample margins of error, with the confidence level 99% was 4.10%.

Instrument and Measures

The self-made questionnaire which went through validity and reliability assessment, was consisted of multiple answer questions about sociodemographic characteristics, and also 5-point Likert-type scale with response options of Extremely=5; Very=4; Moderately=3; Slightly=2; Not at all=1. The link of the online questionnaire, made with Google Forms, was distributed to social media users via Instagram and Telegram Apps, and it was open to participants for 5 months, and 2 days.

Statistical Hypotheses

Bayesian hypothesis testing was employed to test hypotheses. Prior values of Bayesian SEM of IBM SPSS Amos Graphics 22 Software were used to test hypotheses, as follows: Mean = 0; S.D = 1. H0 was accepted when zero fell between posterior confidence intervals (H0: $LCI \leq 0 \leq UCI$; H1: $0 < LCI < UCI$; or $LCI < UCI < 0$; Confidence Level= 99%). The initial hypotheses were as follows:

H_1: Low Self-Control increases Trolling/ Flaming Behaviors.

H_2: Depression increases Trolling/ Flaming Behaviors.

H_3: Negative Interpersonal Relationships increase Trolling/ Flaming Behaviors.

Validity Assessment

To assess the content and face validity of the current instrument, 10 experts rated the items developed from the approved constructs in the initial validating process. In the phase of assessing the face validity, 6 participants validated the items. Face validity was assessed by both experts and participants. The content and face validity assessment questions in the current research were adopted from different studies by Zamanzadeh, Ghahramanian, Rassouli, Abbaszadeh, Alavi-Majd and Nikanfar (2015), Polit and Beck (2006), Yaghmaie (2003), and Lawshe (1975). The mean scores were calculated and rounded by Excel software, and items with an Item-level content validity index (I-CVI) (Polit & Beck, 2006, p. 490) of $\geq .78$ were retained in the scale. Scale-Level Content and Face Validity (S-CVI/Ave) (Polit, Beck & Owen, 2007, pp. 460-461) were .95 and .92 respectively ($\geq .90$ = Excellent Content Validity (Polit & Beck, 2006, p. 493)).

Reliability Assessment

In the pilot study phase, the link of the questionnaire was sent to participants and 25 persons filled it out. In exploratory research and pilot studies, sample sizes between 10 and 30 are sufficient (Johanson & Brooks, 2010, p. 395; Hill, 1998, p. 7/10). For instrument development, 25 to 40 people is recommended (Johanson & Brooks, 2010, p. 395). After the conduction of the pilot study, a priori

reliability assessment of the instrument was operated. Cronbach's alpha was calculated by IBM SPSS Statistics 22 software.

After the conduction of pilot study, final study was administered, and post hoc reliability assessment was conducted, subsequent of an exploratory factor analysis (EFA). Exploratory factor analysis (EFA) was conducted to identify "the dimensionality of constructs by examining relations between items and factors when the information of the dimensionality is limited" (Yu & Richardson, 2015, p. 127). "Researchers report coefficient alpha after they have conducted a factor analysis of their items" (Iacobucci, 2001, p. 58).

Nunnaly has indicated .7 as an acceptable reliability coefficient, but lower thresholds are sometimes used in the literature (Reynaldo & Santos, 1999; Huang, Wang, Wu, & Wang, 2013, p. 219). Shi, Cristea, Foss, Al Qudah, and Qaffas (2013) mentioned $.6 \leq \alpha < .7$, and $.7 \leq \alpha < .9$ as acceptable and good values of Cronbach's α, respectively. The Cronbach's alphas for each final variable in the model were as follows: Depression = .78 (good); Negative Interpersonal Relationships= .79 (good); Low Self-Control= .73 (good); and Trolling/ Flaming Behaviors= .60 (acceptable).

Results

In the following section, the results of employed descriptive and inferential statistical procedures are presented.

Descriptive Statistics

Sociodemographics

The participants were almost equally split by gender, and 45% of them were in the age range of 25-34 years old, and around 43% were in the age range of 18-24, and 35-44 years old. Slightly more than half of the participants were single, and 37%, and 11% were Married, and in a relationship, respectively. The participants were majorly non-parents (around 73%), somehow university-educated (around 76%, of which around 62% had studied in Bachelor's and Master's Degrees), which around 31 percent of them were students. The participants were also majorly in middle income class (84%) who were living in province capitals (68%). Eighty-two percent of participants had used Internet for more than 5 years, of which more than half had used it for more than 10 years. Less than half of the participants were heavy Internet consumers, with daily use of more than 4 hours.

Multivariate Normality Test

In IBM SPSS Amos, "multivariate normality is measured by Mardia's multivariate kurtosis", and "outliers are indicated by their Mahalanobis distances", which larger distances demonstrate larger contributions of outliers "to Mardia's multivariate kurtosis and hence to the departure from multivariate normality" (Gao, Mokhtarian & Johnston, 2008, p. 2). The critical ratio for skew and kurtosis values of each item of questionnaire was greater than 1.96, hence the multivariate normality assumption for the scale was not held.

Linearity Analysis

In SEM, Linearity among exogenous and endogenous variables is assumed, and demonstrated by the steady slope of change in the relationship between an independent and a dependent variable (Promes, 2016, p.286). To assess the linearity, "regression curve estimation was conducted for each variable on at least one other variable"; F-values for the linear equation should be larger than any other equations listed in the curve estimation (Promes, 2016, p.286). All relationships of exogenous variables with the two endogenous variables were separately assessed for linearity. All exogenous variables had significant R-square and F-values, and were sufficiently linear to be tested in a SEM model (i.e., even some of the variables did not have the highest F-values among other indices for linearity, they had significant values and their F-values were close to the other indices). "[M]odels with nonlinear relationships are often encountered in social and behavioral sciences" (Lee & Zhu, 2003). To address the nonlinearity issue of variables, the use of Maximum likelihood and bootstrap (Sohn & Menke, 2002), and also Bayesian approach (Dunson, Palomo & Bollen, 2005, p. 2) via Markov chain Monte Carlo (MCMC) methods (Green & Worden, 2015) (an algorithm employed by AMOS software) (Byrne, 2016, p. 153) are

recommended. In the current research Maximum Likelihood estimation, Bootstrap, and Bayesian methods were employed to deal with nonlinearity and nonnormality issues.

Multicollinearity Analysis

Multicollinearity (near-linear dependence) is a violation of one of the basic assumptions for regression models; It "appears when two or more independent variables in the regression model are correlated"; Moderate to high multicollinearity issues should be resolved (Daoud, 2017, p. 1). Multicollinearity of all variables were assessed one-by-one, using Linear Regression analysis, and it was concluded that variables were not multicollinear.

Inferential Statistics

Structural Equation Modeling

"Structural equation modeling (SEM) is a statistical methodology that takes a confirmatory (i.e., hypothesis-testing) approach to the analysis of a structural theory bearing on some phenomenon" (Byrne, 2016, p. 3). The full latent variable (LV) model "comprises both a measurement model and a structural model: the measurement model depicting the links between the latent variables and their observed measures (i.e., the CFA model), and the structural model depicting the links among the latent variables themselves" (Byrne, 2016, p. 7). "The most important assumption of the maximum likelihood estimation method is the multivariate normal distribution. This assumption is often violated because ordinal and discrete scales are generally used in social sciences" (Civelek, 2018, p. 41). One approach to deal with the multivariate nonnormal data is to use the bootstrap method, which is "a resampling procedure by which the original sample is considered to represent the population" (Byrne, 2016, p. 367). In the current study, the Maximum Likelihood (ML) estimation, and Bootstrap ML and Bollen-Stine bootstrap, with 2000 bootstrap samples were employed to draw the SEM models. According to Arifin and Yusoff, (2016, p. 4), "[m]odel revisions were done based on assessments of factor loadings, standardized residuals (SRs), and modification indices (MIs), while maintaining the congenericity of the measurement model within the theoretical framework. Items with factor loadings < 0.5 were considered for removal".

Some of the most-reported goodness-of-fit indices and their cutoffs are presented for the measurement model: Chi-square (CMIN)= 33.308, Degrees of freedom= 18, Probability level= .015 (In terms of Bollen-Stine bootstrap p= 0.062; p >.05; Byrne, 2016); CMIN/DF= 1.850 (< 3.0; Moss, Lawson & White, 2015); RMSEA= .029 (< .05 (Good); Moss, Lawson & White, 2015); GFI= .993 and AGFI= .982 (> .90; Moss, Lawson & White, 2015); and NFI= .988 (> .95; Hooper, Coughlan & Mullen; 2008). Regarding the fit indices, the measurement model demonstrated a very good fit to the data.

Construct Validity Assessment

Construct validity of the model was assessed according to Mahmood (2018, p. 86), Arifin & Yusoff (2016, p. 4), Hatcher & O'Rourke (2013, pp. 238 & 244), and Bagozzi (1977).

Convergent validity can be "indicated by an item factor loading ≥ 0.5 and p < .05[…], Average Variance Extracted (AVE) ≥ 0.5, and Composite Reliability (CR) ≥ 0.7" (Arifin & Yusoff, 2016, p. 4). Discriminant validity can be "evaluated by comparing factor AVE values with shared variances (SVs) between the factors, which are the squared correlations between any two factors. The factors were considered discriminant when the AVE values were greater than the SV values" (Arifin & Yusoff, 2016, p. 4; Hatcher & O'Rourke, 2013, p. 244). Composite reliability (CR), convergent and discriminant validity of the constructs of measurement model were assessed employing ValidityMaster tool developed by Gaskin (2018). All factor loadings were ≥ .58, AVE ≥ 0.5, and CR ≥ 0.7 (except for Trolling/ Flaming Behaviors that was close to .70). All criteria showed that convergent validity was established. As all factor AVE values were greater than shared variances (SVs), it can be concluded that discriminant validity was also established.

The Full Latent Variable Model

In contrast to the factor analytic model (measurement model), the full latent variable (LV) model enables researcher to "hypothesize the impact of one latent construct on another in the modeling of causal

direction"; "it comprises both a measurement model and a structural model" (Byrne, 2016, p. 7), and has two following types: recursive (unidirectional causal models) and non-recursive (bidirectional causal models which "have feedback loops or simultaneous causal paths") (Kozlowski, 2012, p. 83). It is worthy to mention that "[c]alculation of indirect and total effects among variables in a feedback loop […] assumes equilibrium", but "there is no statistical test of whether the equilibrium assumption is tenable when the data are cross sectional" (Kline, 2015, p. 364). Anyway, it should be mentioned that the stability index values less than 1.0 are usually interpreted as "positive evidence for equilibrium" and values greater than 1.0 are interpreted as the lack of equilibrium (Kline, 2015, p. 364). In the current research, after conducting confirmatory factor analysis, and validity assessment of the measurement model, the full latent variable model was drawn up employing Maximum Likelihood (ML) estimation, and Bootstrap (Bootstrap ML and Bollen-Stine bootstrap, with 2000 bootstrap samples). The model is non-recursive as three following variables are non-recursive and have reciprocal relationships: Low Self-Control, Negative Interpersonal Relationships, and Depression. Stability index for these variables was .155 (less than 1.0), that shows equilibrium in the model, but as mentioned before, the equilibrium assumption for cross sectional data may not be hold.

The proposed initial non-recursive model had standardized regression coefficients greater than one, and negative R^2. Although "standardized regression coefficients greater than one can legitimately occur" (Deegan, 1978, p. 873), and the occurrence of the negative R^2 in non-recursive systems, is not problematic, and indeed the traditionally used formula is problematic (Hayduk, 1996, p. 113), but to increase the model fit, to decrease the stability index value to acceptable range, and also to identify the model, "equality constraints on [all] the reciprocal paths" (labeled a, b, and c) (Martens & Haase, 2006, p. 898) were imposed. Low Self-Control variable had the strongest effect on Trolling/ Flaming Behaviors. The Depression- Trolling/ Flaming Behaviors path was statistically insignificant.

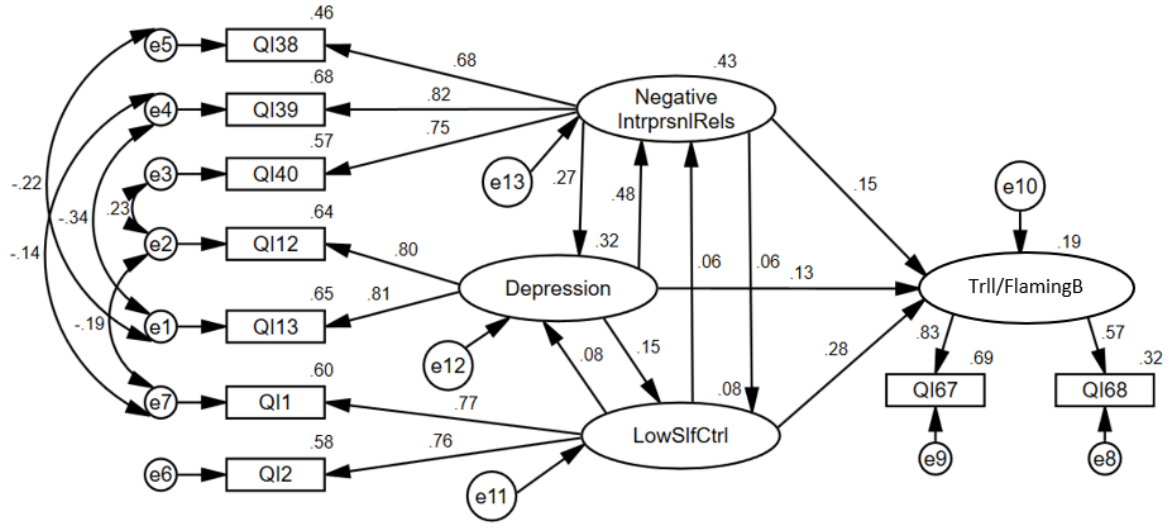

Figure (1): The Full Latent Variable Model

Some of the most-reported goodness-of-fit indices and their cutoffs are presented for the full latent variable model: Chi-square (CMIN)= 18.003, Degrees of freedom= 16, Probability level= .324 (p > .05; Hooper, Coughlan & Mullen; 2008); CMIN/DF= 1.125 (< 3.0; Moss, Lawson & White, 2015); Bollen-Stine bootstrap p= .521 (>.05; Byrne, 2016); RMSEA= .011 (< .01 (Very Good); Moss, Lawson & White, 2015); GFI= .996 and AGFI= .989 (> .90; Moss, Lawson & White, 2015); and NFI= .993 (> .95; Hooper, Coughlan & Mullen; 2008). Regarding the fit indices, the SEM model demonstrated an excellent fit to the data.

Effect Sizes and Post Hoc Power Analysis

To calculate achieved power, post hoc power analysis was conducted employing G*Power 3.1.9.2 software (Faul, Erdfelder, Buchner & Lang, 2009), using post hoc power analysis for *F* tests (Linear

multiple regression). According to the effect sizes (Low Self-Control= 0.09051254 (Small), Negative Interpersonal Relationships= 0.754386 (large), Depression= 0.4727541 (large), and Trolling/ Flaming Behaviors= 0.2269939 (Medium)), Error Probability Level = 0.01, and in terms of the number of predictors= 2 & 3, the achieved power was > .999. Due to large sample size, and the number of predictors in the model, the test is somehow overpowered for the achieved effect sizes.

Bayesian Hypothesis Testing

In the current research, Bayesian hypothesis testing was employed to test hypotheses. In "Bayesian data analysis, the posterior distribution is the ultimate result of the experiment, and questions relative to hypothesis testing are answered by verifying if parameters values corresponding to a condition with no effect [(for example, zero for mean values)], fall within a confidence interval in the posterior" (Berkes & Fiser, 2011, p. 2). Prior values of Bayesian SEM of IBM SPSS Amos Graphics 22 Software were used to test hypotheses, as follows: Mean = 0; S.D = 1. H_0 was accepted when zero fell between posterior confidence intervals. Posterior predictive p (PPP) value for the model was .42, which showed an excellent-fitting model. According to Muthén and Asparouhov (2012), an excellent-fitting model should have a PPP value around 0.5 (p. 10). Enough Bayesian samples had been drawn on the basis of the convergence statistic (C.S.) (C.S < 1.002) (Byrne, 2016, pp. 153-154). With generating 73 additional samples (500+73.501), the C.S. reached the value of 1.0009. The Bayesian hypothesis testing with 99% confidence level, rejected two hypotheses, and only accepted the hypothesis that Low Self-Control increases Trolling/ Flaming Behaviors. Hence, according to the model, New Subsidiary hypotheses were considered, and the effects of Low Self-Control on Depression, and effects of Depression on Negative Interpersonal Relationships were accepted.

Table (1): Bayesian Hypothesis Testing

H_0 is accepted when zero falls between posterior confidence intervals.				
Hypothesis	99% Lower bound	99% Upper bound	Null Hypothesis	Alternative Hypothesis
H_1: Low Self-Control increases Trolling/ Flaming Behaviors.	0.082	0.233	Rejected	Accepted
H_2: Depression increases Trolling/ Flaming Behaviors.	-0.016	0.112	Accepted	Rejected
H_3: Negative Interpersonal Relationships increase Trolling/ Flaming Behaviors.	-0.008	0.170	Accepted	Rejected
Subsidiary Hypotheses	99% Lower bound	99% Upper bound	Null Hypothesis	Alternative Hypothesis
$H_{1\text{-}1S}$: Low Self-Control increases Negative Interpersonal Relationships.	-0.006	0.123	Accepted	Rejected
$H_{1\text{-}2S}$: Low Self-Control increases Depression.	0.045	0.167	Rejected	Accepted
$H_{2\text{-}1S}$: Depression increases Negative Interpersonal Relationships.	0.303	0.418	Rejected	Accepted

Hypothesis Testing of Indirect (Mediating) Effects

As the effects of Depression and Negative Interpersonal Relationships on Trolling/ Flaming Behaviors were not statistically different than zero, the mediating effect of Low Self-Control was hypothesized. Due to the reciprocal nature of the paths, the indirect effects outputs of Bayesian statistics were equivocal for mediator hypothesis testing. Hence, the hypothesized paths were identified and named on the model, and bootstrap method were employed to calculate interval confidences. Using bootstrap with 2000 samples, and 99 percentile confidence level, the mediating effect of Low Self-Control was tested. H_0 was accepted when zero fell between confidence intervals. The alternative hypothesis that Low Self-Control mediates the effects of Depression and Negative Interpersonal Relationships on Trolling/ Flaming Behaviors, was accepted.

Table 2: Hypothesis Testing of Indirect (Mediating) Effects

H_0 is accepted when zero falls between confidence intervals.						
Hypothesis	Estimate	99% Lower bound	99% Upper bound	*P* Value	Null Hypothesis	Alternative Hypothesis
$H_{1\text{-}1M}$: Low Self-Control mediates the effects of Depression on Trolling/ Flaming Behaviors.	.096	.031	.229	.001	Rejected	Accepted
$H_{1\text{-}2M}$: Low Self-Control mediates the effects of Negative Interpersonal Relationships, through Depression, on Trolling/ Flaming Behaviors.	.150	.055	.324	.001	Rejected	Accepted

Discussion

The main purpose of the current quantitative study is to examine the effects of Low Self-Control, Negative Interpersonal Relationships, and Depression on social control of Trolling/Flaming Behaviors among Iranian users. To reach this purpose, several hypotheses are developed; instrumentation, and validity and reliability assessment processes are completed, and the final questionnaire is administered to Iranian social media users, via an online questionnaire. Altogether, 989 participants have filled the questionnaire out, in pilot and final study. The participants of the current study were almost split in half, in terms of gender. Almost half of them were in the age range of 25-34 years old, single, and university-educated, and 30% of them were students. More than 80% of participants consider themselves middle-income. Around 70% live in province capitals. More than 40 percent of participants are heavy internet users.

After conducting descriptive statistics, the research questions and hypotheses are examined through inferential statistics. The resultant model from the structural equation modeling is shown below:

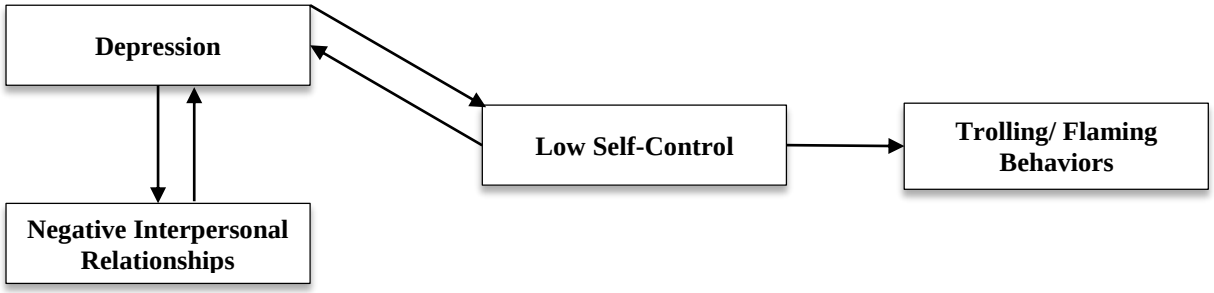

Figure (2): The Resultant Model from the Structural Equation Modeling

What is the impact of "Low Self-Control" on Iranian users' Trolling/Flaming Behaviors? The results show that Low Self-Control increases Trolling/Flaming Behaviors, and also Depression, and Negative Interpersonal Relationships. Low Self-Control acts as a mediator between Depression and Trolling/Flaming Behaviors, and also between Negative Interpersonal Relationships and Trolling/Flaming Behaviors through Depression. The results are consistent with self-control theory that emphasizes the importance of self-control as the major cause of crime regardless of its place in time, history, context, and types of criminal acts (Piquero, 2009, pp. 153-154). The results are also consistent with the findings of Li, Holt, Bossler and May (2016), Vazsonyi, Machackova, Sevcikova, Smahel and Cerna (2012), and Higgins, Wolfe and Marcum (2008) about the effects of low self-control on online misconducts and crimes (i.e., cyberbullying and digital piracy). The results are also consistent with Aliverdinia, Memar and Nosratzehi's (2015) findings about the inverse correlation between self-control and deviant behaviors, and Aliverdinia and Saleh Nejad's (2012) findings that demonstrated self-control is the strongest predictor of boys' and girls' deviant behaviors.

What is the impact of "Depression" on Iranian users' Trolling/Flaming Behaviors? The results show that Depression has no direct effect on Trolling/ Flaming Behaviors, but it has an indirect effect through Low Self-Control, on Trolling/ Flaming Behaviors. The effect of Depression on Trolling/Flaming

Behaviors is consistent with Agnew's (2009, p. 170) General Strain Theory that argues strains lead to negative emotional states such as depression, that may increase crime. It is also consistent with the Peterson and Densley's (2017, p. 196) notion that online violence and aggression may "attract individuals with a distinct set of internalizing traits such as depression [and suicidal ideation] or shyness".

What is the impact of "Negative Interpersonal Relationships" on Iranian users' Trolling/Flaming Behaviors? The results demonstrate that Negative Interpersonal Relationships have no direct effect on Trolling/ Flaming Behaviors, but they have an indirect effect through Depression, and Low Self-Control, on Trolling/ Flaming Behaviors. The effect of Negative Interpersonal Relationships on Trolling/Flaming Behaviors is consistent with the strains that are predicted to be most conducive to crime, mentioned by Agnew (Worthen, 2016, pp. 53-54; Agnew, 2009, p. 174).

The implications for practice are presented for each research finding: As Low Self-Control increases Trolling/Flaming Behaviors, and acts as a mediator for other variables, this finding suggests that initiatives concentrated on the self-control especially among children, youth, and young adults, can be an effective measure for decreasing online Trolling/ Flaming behaviors. As Depression and Negative Interpersonal Relationships increase Low Self-Control, hence, improving personal and social psychological health, and also communication skills especially among youth and young adults can reduce the online Trolling/ Flaming behaviors.

Limitations of the Study: The current study examines the effects of three variables on Trolling/ Flaming Behaviors among Iranian users, hence, the number of variables is limited, and also the results are limited to the Iranian users and their special contextual and cultural characteristics.

Implications for Further Research: Due to the limitation of the current study, it is recommended, for future study, to include more variables in a full latent variable SEM model, to examine the multivariate relationship among variables. Findings of the study demonstrate that self-control acts as a mediator among examined variables. It is recommended to further study the mediating role of self-control in committing cybercultural transgressions, especially in other cultural contexts.

Conclusion

The current quantitative study aims at examining the effects of Low Self-Control, Depression, and Negative Interpersonal Relationships on social control of Trolling/ Flaming Behaviors. The literature employed various, scattered perspectives to study the means of social control in cyberspace. The most important contribution of the current research is the recognition of low self-control as a mediator which conveys the effects of other variables to online Trolling/ Flaming Behaviors. The findings can be employed to devise non-coercive policies and initiatives to socially control cybercultural transgressions.

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