

Cyber dating violence: A Review of Its Research Methodology

Carmen Rodríguez-Domínguez^{1*}, Pedro J. Pérez-Moreno¹, and Mercedes Durán²

¹ Department of Clinical and Experimental Psychology, Faculty of Education, Psychology and Sports Sciences, University of Huelva (Spain).

² Department of Social Psychology, University of Sevilla (Spain).

Título: Ciberviolencia en las relaciones de pareja: una revisión sobre su metodología de investigación.

Resumen: En los últimos años ha aumentado el interés por el estudio de la ciberviolencia en la pareja, sin embargo es necesario examinar la metodología de investigación que sustenta las evidencias obtenidas hasta el momento. Este artículo presenta una revisión sistemática de la literatura científica que analiza 30 instrumentos de medida de ciberviolencia en la pareja de adolescentes y jóvenes adultos utilizados a lo largo de estos años. Los principales resultados muestran una elevada pluralidad metodológica, conceptual y terminológica, observándose un reducido número de instrumentos con suficientes garantías psicométricas. Predominan los trabajos de procedencia estadounidense y, entre los instrumentos aplicados en muestras españolas, destaca una infrarrepresentación de indicadores de ciberviolencia de tipo sexual, lo que limita la comprensión de esta problemática. Esta investigación aporta información sobre el estado actual en el estudio de la ciberviolencia en la pareja y pone de relieve deficiencias metodológicas en la construcción del conocimiento en este campo de estudio. Este trabajo permite una mejor comprensión de la disparidad de resultados señalada por investigaciones previas, especialmente referidas a prevalencia, frecuencia y diferencias de género en este tipo de comportamientos violentos, además de sentar las bases para abordar el fenómeno desde el rigor científico.

Palabras clave: Ciberviolencia de pareja; revisión; metodología; investigación; adolescentes; jóvenes.

Abstract: In recent years there has been increased interest in the study of cyber dating violence, however it is necessary to examine the research methodology that supports the evidence obtained so far. This article presents a systematic review of the scientific literature that analyzes 30 instruments for the measurement of cyber dating violence in adolescents and young adults used throughout these years. The main results show a high methodological, conceptual and terminological plurality, and a reduced number of instruments with sufficient psychometric guarantees is observed. The majority of the work is originated in the United States and, among the instruments applied in Spanish samples, there is an underrepresentation of indicators of sexually based cyber dating violence, which limits the understanding of this problem. This research provides information on the current state in the study of cyber dating violence and highlights methodological deficiencies in the construction of knowledge in this field of study. This work enables a better understanding of the disparity of results pointed out by previous research, especially referring to prevalence, frequency and gender differences in this type of violent behavior, as well as laying the foundations to tackle the phenomenon with scientific rigor.

Keywords: Cyber dating violence; review; methodology; research; adolescents; youth.

Introduction

New technologies have occupied a privileged space in people's lives (Castells & Cardoso, 2005), including relationships, although they can also be used to exert violence. In this sense, the empirical tradition on abuse and technological aggressions has developed around four main lines of research: (a) cyber violence in adolescence (Aboujaoude, Savage, Starcevic & Salame, 2015; Rodríguez-Domínguez, Martínez-Pecino & Durán, 2015), (b) sexually-motivated cyber violence perpetrated by adults towards minors (Górriz, 2016), (c) gender-based cyber violence (e.g., Donoso, Rubio & Vilà, 2017; 2018), also including cyber violence towards women by their romantic partners (e.g., Torres, Robles & De Marco, 2013); and (d) cyber violence produced within underage and/or adult relationships, whether exercised by men or women in same-sex or different-sex relationships (e.g., Borrajo, Gámez-Guadix & Calvete, 2015a; Dank, Lachman, Zweig & Yahner, 2013; Gámez-Guadix; Borrajo & Calvete, 2018; Martínez-Pecino & Durán, 2016; Zweig, Lachman, Yahner & Dank, 2014).

As far as this last line of research is concerned, certain methodological shortcomings are identified.

Firstly, the diversity of contexts in which violent cyber behaviors are reproduced is compounded by the use of different terms to describe this problem (Gámez-Guadix et al., 2018).

Secondly, it is difficult to establish a definitive classification of the different manifestations of this type of violence, as new behaviors emerge as technologies and our use of them evolve (Rodríguez-Domínguez, 2015; Torres et al., 2013). An example of this would be the recent emergence of new sexual practices related to cyber violence, such as sexting (Ibarra, 2014; Quesada et al., 2018; Rodríguez-Domínguez, Moreno & Durán, 2017) where the contents exchanged, at first, with consent (McLaughlin, 2010; Pérez et al., 2011; Wolak & Finkelhor, 2011), are subsequently used criminally to extort or harm the victim (Rodríguez-Domínguez et al., 2017).

Finally, another problem in cyber dating violence research was pointed out by Borrajo et al. (2015b), who maintain that the instruments used to study this construct do not show adequate psychometric properties, either because they underrepresent the construct by focusing on measuring specific types of cyber dating violence, or because they do not provide evidence of validity. The analysis of the evidences of validity and reliability would be a fundamental requirement in scientific research on human behavior (Prieto & Delgado, 2010). Thus, in the measurement of psychological variables it would be essential for studies to report on the reliability or stability of the measure and also on the factorial structure of

*** Correspondence address [Dirección para correspondencia]:**

Carmen Rodríguez-Domínguez. Campus de «El Carmen», Avenida de las Fuerzas Armadas, S/N. 21007 Huelva (Spain).

E-mail: mcarmen.rodriguez@dpces.uhu.es

(Article received: 28-3-2019, revised: 12-4-2019, accepted: 16-10-2019)

the instruments as an approximation to the validity of the construct, in addition to generating additional evidence of empirical validity referring both to the construct and to the content or criterion (Fernández, 2008).

This disparity of study perspectives, together with the lack of evidence of validity and reliability of the instruments used, hinders a proper understanding of cyber dating violence (hereinafter CDV). As a public health problem (David-Ferdon & Feldman, 2007) with social and psychological repercussions (Donoso-Vázquez, 2018; Jabaloyas, 2015), it becomes necessary to solve both problems.

The objective of this review work is to analyze the methodology used to date in the evaluation of the CDV, identifying the dimensions of the phenomenon, as well as the main measurement instruments and the evidence of validity and reliability obtained through their use.

Method

Search

The search for scientific articles was conducted in April 2018 in the databases Psycinfo, Scielo, Pubmed and Web of

Science. The following keywords were used in English: "cyber stalking", "cyber harassment", "online violence", "cyber dating violence", "cyber dating abuse", "cyber victimization", "cyber aggression", "electronic dating violence", "sextortion" and "revenge porn", and in Spanish: "ciberviolencia", "ciberacoso", "violencia online", "violencia internet", "cibervictimización", "ciberagresión", "sextorsión" and "pornografía de venganza". The search was not limited to a temporary period, nor was the country of origin of the study limited.

Refining and systematization of information

The selection of articles was made according to the following inclusion criteria: (a) the research must provide findings in relation to CDV regardless of the methodology used; (b) the participants may be minors and/or adults (early and intermediate adulthood); (c) the work must include the CDV instrument used or provide information to access it; (d) the work must be published in English or Spanish. Theoretical articles were excluded. Figure 1 shows the diagram of search and selection of the sources analyzed, finally obtaining a total of 59 scientific articles on CDV.

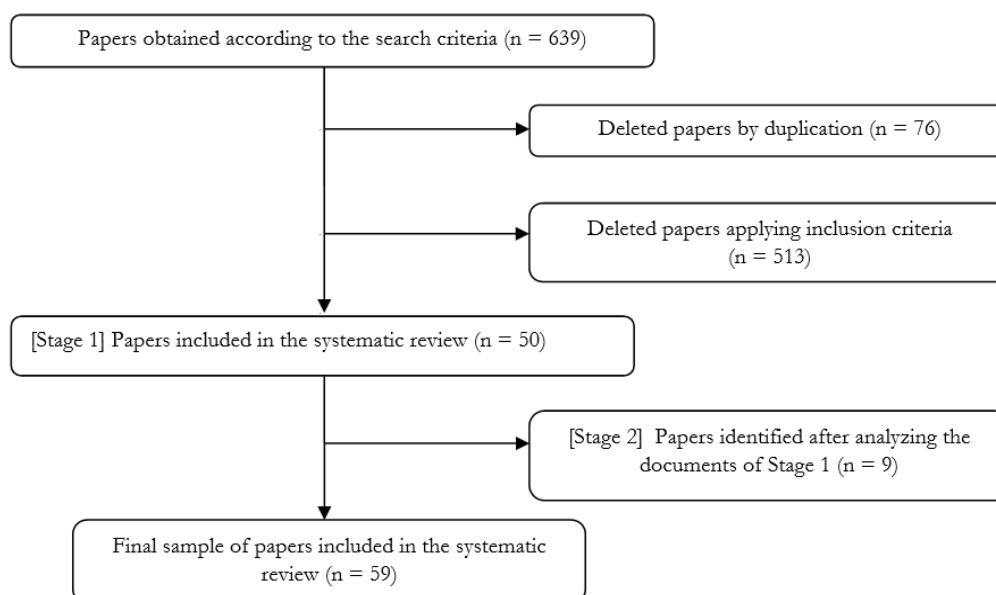


Figure 1. Search diagram and selection of the analyzed sources (own elaboration)

Results

Psychometric properties of measuring instruments

From the sample of 59 valued items, thirty CDV measuring instruments were identified. Table 1 presents the main characteristics of these instruments and the corresponding research. Only the first published study that uses the instrument or the one that provides the analysis of its psychometric properties is included.

The range of years in which this research has been published is from 2007 to 2018. All instruments examined were self-reports, with 50% using an online format as opposed to the traditional paper format. The items were predominantly scalar response ($n = 23$; 76.6%), in a range of 4 to 7 options depending on the frequency or timing of the CDV indicators. Twenty different terms were identified to designate the construct to be measured for each instrument, most of them Anglo-Saxon terminology. In 13.3% ($n = 4$) of the cases no reference was made to the psychometric properties of the in-

strument. On the other hand, in 50% ($n = 15$) of the cases data were provided on evidence of reliability, in 33.3% ($n = 10$) on reliability and validity, and only in one case (3.3%) on validity exclusively.

As for reliability evaluations, the study of internal consistency using Cronbach's alpha prevailed, with coefficients higher than .70 in most cases, except in three papers (Sánchez, Muñoz-Fernández, Lucio & Ortega-Ruíz, 2017; Smith-Darden, Kernsmith, Victor & Lathrop, 2017; Temple et al., 2016). In terms of evidence of validity, the internal

structure was studied to a greater extent by means of exploratory and/or confirmatory analysis.

In three cases, sexual CDV dimensions were specifically addressed (Dick et al., 2014; Smith-Darden et al., 2017; Zweig, Dank, Yahner & Lachman, 2013), and a specific instrument within this typology was found (Drouin et al., 2015). According to the five Spanish instruments, only the one published by Borrajo and collaborators (2015b) contained a single item of sexual CDV (sending and/or uploading photos and/or videos with intimate or sexual content of a partner) without permission.

Table 1. CDV instruments and main features.

Instruments / Source	Type*	Scale / Factor [items]	Psychometric properties
1 <i>Tech abuse in teen relationships</i> Picard (2007)	Online; Dichotomous response (Y/N)	PER. [13] & VIC. [13]	Not indicated
2 <i>Cyber aggression between intimate partners</i> Melander (2010)	Paper; Dichotomous response (Y/N)	PER. [11] & VIC. [11]	Not indicated
3 <i>Electronic Victimization</i> Bennet, Guran, Ramos & Margolin (2011)	Online; Scalar response (5 points: "Never" - "More than 10 times")	VIC. [22] (a) Hostility [7] (b) Humiliation [5] (c) Exclusion [3] (d) Intrusion [7]	Reliability (a) $\alpha = .74$ (b) $\alpha = .74$ (c) $\alpha = .77$ (d) $\alpha = .73$
4 <i>Controlling Partners Inventory</i> Burke, Wallen, Vail-Smith & Knox (2011)	Online; Scalar response (5 points: "Never" - "4 or more times")	PER. [18] & VIC. [18] (a) Photos, camera & SpyWare [8] (b) Excessive communication [4] (c) Threatening [3] (d) Checking behaviors [3]	Validity: EFA Reliability: $\alpha = .90$; G.C. = .85; S-B.C. = .75
5 <i>Facebook harassment</i> Lyndon, Bonds-Raacke & Cratty (2011)	Online; Scalar response (4 points: "Never" - "All the time")	PER. [13] (a) Covert Provocation [5] (b) Public Harassment [5] (c) Venting [3]	Validity: EFA Reliability: (a) $\alpha = .81$ (b) $\alpha = .79$ (c) $\alpha = .88$
6 <i>Hurtful cyber-teasing</i> Madlock & Westerman (2011)	Paper; Scalar response (5 points: "No way" - "A lot")	VIC. [6]	Reliability: $\alpha = .77$
7 <i>Interpersonal Electronic Surveillance Scale for Social Networking Sites</i> Tokunaga (2011)	Online; Scalar response (7 points)	PER. [12]	Validity: EFA y CFA Reliability: $\alpha = .97$
8 <i>Cyber aggression perpetration</i> Schnurr, Mahatmya & Basche (2013)	Online; Dichotomous response (Y/N)	PER. [5]	Reliability: Men $\alpha = .76$; Women $\alpha = .71$
9 <i>Cyber dating abuse</i> Zweig et al. (2013)	Paper; Scalar response (4 points: "Never" - "Very often")	PER. [16] & VIC. [16] (a) Sexual Cyber abuse [4] (b) No sexual Cyber abuse [12]	Reliability: PER. (a) $\alpha = .88$; (b) $\alpha = .92$ VIC. (a) $\alpha = .81$; (b) $\alpha = .89$
10 <i>Electronic Use Pursuit Behavioral Index (EUPBI)</i> Strawhun, Adams & Huss (2013)	Paper; Scalar response (5 points: "Never" - "Very often") and an open response item	PER. [21] & VIC. [21]	Reliability: PER. $\alpha = .78$ VIC. $\alpha = .90$
11 <i>Digital Dating Abuse (Current Population Survey)</i> Tompson, Benz & Agiesta (2013)	Online; No response format indicated	VIC. [16]	Not indicated
12 <i>Cyber dating abuse</i> Dick et al. (2014)	Online; Scalar response (5 points: "Never" - "Every day or almost every day")	VIC. [7] (a) Sexual [3] (b) No sexual [4]	Reliability: $\alpha = .72$
13 <i>Cyber Psychological Abuse Scale</i> Leisring & Giumetti (2014)	Online; Scalar response (7 points: "Never" - "More than 20 times")	PER. [9] & VIC. [9] (a) Minor [6] (b) Severe [3]	Validity: CFA; EFA; convergent, divergent and concurrent Reliability: PER. $\alpha = .82$; VIC. $\alpha = .81$
14 <i>Cyber dating abuse</i> Borrajo et al. (2015a)	Paper; Open response (frequency of behavior)	VIC. [9]	Not indicated

Instruments / Source	Type*	Scale / Factor [items]	Psychometric properties
15 <i>Cyber dating abuse questionnaire</i> Borrajo et al. (2015b)	Online; Scalar response (6 points: "Never" – "More than 20 times").	PER. [20] & VIC. [20] (a) Control [9] (b) Direct aggression [11]	Validity: CFA y EFA; Convergent. Reliability: PER. (a) $\alpha = .81$; (b) $\alpha = .73$ VIC. (a) $\alpha = .87$; (b) $\alpha = .84$
16 <i>Electronic Teen Dating Violence perpetration</i> Cutbush (2015)	Paper; Scalar response (4 points: "Never" – "10 or more times")	PER. [8]	Validity: Structural Equation Model, invariance by gender (metric / scalar)
17 <i>Sexting coercion</i> Drouin, Ross & Tobin (2015)	Online; No response format indicated	VIC. [32] (a) Resource manipulation (b) Ommitment manipulation (c) Defection threat	Reliability: (a) $\alpha = .95$; (b) $\alpha = .97$; (c) $\alpha = .98$; Total $\alpha = .98$
18 <i>Self-reported Partner-Directed Cyber Aggression</i> Wright (2015)	Paper; Scalar response (5 points: "Never" – "All the time")	PER. [5] (a) Cyber relational aggression [3] (b) Privacy invasion [2]	Validity: CFA Reliability: (a) $\alpha = .91$, .91 (b) $\alpha = .83$, .82
19 <i>Bullying of boyfriends or girlfriends through the mobile phone and the Internet</i> Martínez-Pecino & Durán (2016)	Paper; Scalar response (4 points: "Never" – "Very often")	PER. [16] (a) Mobile phone (b) Internet	Reliability: (a) $\alpha = .78$ (b) $\alpha = .76$
20 <i>Partner Cyber Abuse Questionnaire</i> Wolford-Clevenger et al. (2016)	Online; Scalar response (6 points: "Never"–"5 or more times")	VIC. [9]	Validity: EFA, convergent. Reliability: $\alpha = .73$
21 <i>Digital dating abuse (DDD)</i> Reed, Tolman y Ward (2016)	Paper; Dichotomous response (Y/N) and scalar response (5 points: "0 times" – "More than 5 times")	PER. [19] & VIC. [19]	Reliability: PER. $\alpha = .73$ VIC. $\alpha = .76$
22 <i>Cyber dating abuse perpetration/ victimization</i> Temple et al. (2016)	Paper; Dichotomous response (Y/N)	PER. [12] & VIC. [12]	Reliability: PER. $\alpha = .65$, .67 VIC. $\alpha = .74$, .79
23 <i>Electronic dating aggression (EDA)</i> Smith-Darden et al. (2017)	Paper; Scalar response (6 points: "Never" – "10 or times")	PER. [12] (a) Cyberstalking (b) Harassment (c) Coercive sexting	Reliability: (a) $\alpha = .47$; (b) $\alpha = .60$; (c) $\alpha = .77$; Total $\alpha = .75$
24 <i>Escala de Violencia de Partner en las Redes Sociales en Adolescentes (E-Vpa)**</i> Muñiz (2017)	Paper; Scalar response (4 points: "Never" – "Always")	PER. [10] (a) e-control [6] (b) e-violence [4]	Validity: CFA Reliability: (a) $\alpha = .86$ (b) $\alpha = .80$
25 <i>The Intimate Partner Cyberstalking Scale</i> Smoker & March (2017)	Online; Scalar response (5 points, Likert: "Strongly disagree" – "Strongly agree")	PER. [21]	Reliability: $\alpha = .92$
26 <i>Electronic aggression perpetration</i> Ramos, Miller, Moss & Margolin (2017)	Online; Scalar response (5 points: "Never" – "More than 10 times")	PER. [4]	Reliability: $\alpha = .83$
27 <i>Agresión en línea en parejas adolescentes</i> Sánchez et al. (2017); three subscales of the <i>Cyberdating Q_A</i> instrument (Sánchez, Muñoz-Fernández & Ortega-Ruíz, 2015)	Paper; Scalar response (5 points: "Never" – "Always")	PER. [11] (a) Online jealousy [4] (b) Online intrusion [4] (c) Online control [3]	Validity: EFA y CFA of the original <i>Cyberdating Q_A</i> instrument Reliability: (a) $\alpha = .84$; .88; (b) $\alpha = .81$; .76; (c) $\alpha = .68$; .79
28 <i>Electronic Teen Dating Violence</i> Cutbush, Williams, Miller, Gibbs & Clinton-Sherrod (2018)	Paper; Scalar response (4 points: "Never" – "10 or more times")	PER. [8] & VIC. [8]	Reliability: PER. $\alpha = .81$, .86, .88, .89 VIC. $\alpha = .85$, .87, .86, .86
29 <i>Cyber aggression victimization</i> Marganski & Melander (2018)	Online; Scalar response (7 points: "Never" – "20 or more times")	VIC. [18]	Reliability: $\alpha = .91$
30 <i>Cyber Dating Abuse Questionnaire</i> Smith et al. (2018)	Paper; Scalar response (5 points: "Never" – "Always")	PER. [8] & VIC. [8]	Validity: Convergent & discriminant (no data provided) Reliability: PER. $H = .86$; VIC. $H = .89$

(Y/N) = Yes/No; PER. = Perpetration; VIC. = Victimization; EFA = Exploratory Factor Analysis; CFA = Confirmatory Factor Analysis; α = Cronbach's alpha; G.C. = Guttman's Coefficient; S-B.C. = Spearman–Brown's Coefficient. H = H's Coefficient

*All are self-reports. **E-Vpa instrument is available through the Lisis Group website (2019).

Research characteristics and main findings

As Table 2 shows, the instruments come mainly from the United States ($n = 22$; 73.3%) and to a lesser extent from Spain ($n = 5$; 16.6%) and from other countries such as the Czech Republic, Australia and Canada ($n = 3$; 9.9%). The phenomenon was especially studied in university populations ($n = 16$; 53.3%) and non-probability samples were taken ($n = 21$; 70%); 43.3% of the studies ($n = 17$) specified the existence of temporal restrictions in the measure of the CDV, most commonly assessing these behaviors in the last year elapsed ($n = 11$; 36.6%) and also in the current relationship ($n = 22$; 73.3%).

Reported prevalence rates of CDV perpetration in minors ranged from 8.8% (Muñiz, 2017; Muñiz & Monreal, 2017) to 38% (Smith-Darden et al., 2017), and in victimization from 22.3% (Temple et al., 2016) to 41% (Dick et al., 2014). In adults, perpetration figures ranged from 16.3% (Ramos et al., 2017) to 71% (Melander, 2010), and victimization from 20% (Drouin et al., 2015; Strawhun et al., 2013) to 75% (Melander, 2010), 76.5% in women and 77.1% in men (Bennett et al., 2011), considering only global indices, although values above these limits were observed in specific items. As for the frequency of CDV, the mean scores found were generally at the lower end of the scale, in adults (Bennett et al., 2011; Reed et al., 2016), and in minors (Sánchez et al., 2017; Temple et al., 2016), although there were results as

disparate as those obtained in the two papers by Borrajo and his team, on the one hand, reporting an average victimization of 23 times in the last six months (Borrajo et al., 2015a), and on the other hand, a much lower average in the last year of the relationship, according to the type of CDV (Borrajo et al., 2015b).

Discrepancies were also observed regarding the participation of men and women in CDVs. In adults, some studies did not detect gender differences in the frequency of perpetration (Ramos et al., 2017; Reed et al., 2016; Tokunaga, 2011), in the frequency of victimization (Drouin et al., 2015; Wolford-Clevenger et al., 2016), or in the chronicity of CDVs (Bennett et al., 2011; Borrajo et al., 2015a; Strawhun et al., 2013; Wolford-Clevenger et al., 2016). This was similar in studies with minors (e.g., Muñiz, 2017; Muñiz & Monreal, 2017; Sánchez et al., 2017; Reed et al., 2016; Smith et al., 2018). Conversely, other studies reported a higher degree of perpetration in older men, in prevalence (Martínez-Pecino & Durán, 2016) and frequency (Leisring & Giumetti, 2014), while others indicated that women exercised these aggressions more often (Burke et al., 2011; Smoker & March, 2017; Strawhun et al., 2013) and men suffered them more often (Cutbush et al., 2018; Reed et al., 2016). These discrepancies were also observed according to the type of CDV assessed (Burke et al., 2011; Dick et al., 2014; Leisring & Giumetti, 2014; Melander, 2010; Zweig et al., 2013).

Table 2. Features of studies on CDV and main results.

Paper	Sample	CDV	Main results
1. Picard (2007)	13-18 years old United States	During the Prevalence relationship	<ul style="list-style-type: none"> ▪ Perpetration: 5% - 24% ▪ Victimization: 5% - 36%
2. Melander (2010)	M = 21 years old Undergraduates N.P. Sampling United States	Last year	Prevalence <ul style="list-style-type: none"> ▪ Perpetration: 71% ▪ Women: checking the partner's phone ▪ Men: (a) creating online group to publish negative information; (b) publishing private information, photos or videos without permission ▪ Victimization: 75% ▪ Men: (a) accessing to private accounts; (b) creating online group to publish negative information; (c) publishing information, photos or videos
3. Bennett et al. (2011)	18-22 years old, Under-graduates N.P. Sampling United States	Last year	Prevalence <ul style="list-style-type: none"> ▪ Victimization (partner): 76.5% women vs. 77.1% men Frequency <ul style="list-style-type: none"> ▪ Victimization: low scores ($M = .14 - .45$). Non-sig. gender differences
4. Burke et al. (2011)	18-23 years old, Under-graduates N.P. Sampling United States	Current or previous re- lationship	Prevalence <ul style="list-style-type: none"> ▪ Perpetration: 1% - 56% women; 2% - 43% men ▪ Women: 5 behaviors (e.g., checking call history) ▪ Men: (a) controlling via GPS; (b) controlling via hidden camera ▪ Victimization: 1% - 65% Women; 3% - 50% Men ▪ Women: 3 behaviors (e.g., checking call history) ▪ Men: 3 behaviors (e.g., publishing inappropriate images) Frequency <ul style="list-style-type: none"> ▪ Perpetration: higher mean score for women ▪ Victimization: higher mean score for women
5. Lyndon, et al. (2011)	18-32 years old Undergraduates N.P. Sampling United States	Former partner	Prevalence <ul style="list-style-type: none"> ▪ Perpetration: 67% covert Provocation; 18% public harassment and ventilation

Paper	Sample	CDV	Main results
6. Madlock & Westernman (2011)	18-33 years old Undergraduates N.P. Sampling United States	Partner Last 6 months	Prevalence ▪ Victimization: 53.8% (moderate or higher grade)
7. Tokunaga (2011)	18-56 years old Undergraduates y General population N.P. Sampling United States	Partner	Frequency ▪ Perpetration: non-sig. gender differences ▪ Negative relationship with age
8. Schnurr et al. (2013)	M = 20.17 (>18) Undergraduates N.P. Sampling United States	Current partner	Perpetration: ▪ High levels of domination by women and CDV (women towards men) reduce the perpetration of physical violence by men ▪ Positive relationship between physical and psychological violence by girlfriends and CDV by their boyfriends ▪ Positive relationship between psychological violence by boyfriends and CDV by their girlfriends
9. Zweig et al. (2013)	7 th -10 th grade schoolchildren United States	Current or previous relationship Last year	Prevalence ▪ Perpetration: 11.8%; more perpetrating girls (general); more boys have exercised sexual CDV ▪ Victimization: 26 %; More girls victims of general and sexual CDV
10. Strawhun et al. (2013)	M = 19.18 years old Undergraduates N.P. Sampling United States	Partner and others context	Prevalence ▪ Perpetration: 26.5% ▪ Victimization: 20.5% Frequency ▪ Perpetration: women commit CDV more frequently ▪ Victimization: non-sig. gender differences
11. Tompson et al. (2013)	14-24 years old, General population P. Sampling United States	Partner and others context	Prevalence ▪ Victimization: 56% (2011); 49% (2013); 15% frequent CDV (5 or more times)
12. Dick et al. (2014)	14-19 years old; Schoolchildren United States	Partner Last three months	Prevalence ▪ Victimization: 41% (general); non-sig. gender differences (sexual); more victim girls (not sexual)
13. Leisring & Giumetti (2014)	M = 19.03 years old Undergraduates N.P. Sampling United States	During discussion Current partner	Prevalence ▪ Perpetration: 93.7% (minor); 13.3% (severe) ▪ Victimization: 93% (minor); 12.6% (severe) Frequency ▪ Perpetration and Victimization (minor): non-sig. gender differences ▪ Perpetration and Victimization (severe): men with higher scores
14. Borrajo et al. (2015a)	18-30 years old Undergraduates N.P. Sampling Spain	Partner Last 6 months	Prevalence ▪ Victimization: 50%; non-sig. gender differences (general), more men (dissemination of personal information or compromised images) Frequency and chronicity ▪ Victimization: 23 times on mean. Non-sig. gender differences
15. Borrajo et al. (2015b)	18-30 years old Undergraduates N.P. Sampling Spain	Partner Last year	Prevalence ▪ Perpetration: 10.6% (direct aggression); 82% (control) ▪ Victimization: 14% (direct aggression); 75% (control) Frequency and chronicity ▪ Perpetration: 5.16 times (direct aggression); 6.97 times (control) ▪ Victimization: 4.83 times (direct aggression); 7.01 times (control)
16. Cutbush (2015)	7 th grade Schoolchildren United States	Partner Last 6 months	Prevalence ▪ Perpetration: 17.1% (1 st measure); 14.1% (2 nd measure)
17. Drouin et al. (2015)	M = 20.6 years old Undergraduates N.P. Sampling United States	Partner or former partner Last year of relationship	Prevalence ▪ Victimization: 20%; non-sig. gender differences Frequency ▪ Women have suffered more from manipulation of commitment

Paper	Sample	CDV	Main results
18. Wright (2015)	M = 17.53 years old Schoolchildren N.P. Sampling Czech Republic	Partner	<ul style="list-style-type: none"> Perpetration: Anxious partner attachment is positively related to CDV and it mediates the relationship between insecure parental attachment (mothers) and CDV
19. Martínez-Pecino & Durán (2016)	18-28 years old Undergraduates N.P. Sampling Spain	Partner Last year	<ul style="list-style-type: none"> Prevalence Perpetration: 48.4% mobile; 37.5% Internet Higher prevalence in men towards their girlfriends (mobile and Internet)
20. Wolford-Clevenger et al. (2016)	M = 18.80 years old Undergraduates N.P. Sampling United States	Partner Last year	<ul style="list-style-type: none"> Prevalence Victimization: 1.1% - 30.7% (according to item). Non-sig. gender differences Frequency Victimization: Non-sig. gender differences
21. Reed et al. (2016)	17-22 years old Undergraduates N.P. Sampling United States	Partner One's whole life and last year	<ul style="list-style-type: none"> Prevalence Perpetration: 69.5% (One's whole life); 62.6% (Last year). Non-sig. gender differences (General); Men: threatening to distribute shameful information and pressing for sexual images to be taken Victimization: 74.1% (One's whole life); 68.8% (Last year) Frequency Perpetration: Low scores. Non-sig. gender differences (General) Victimization: scores. Non-sig. gender differences (General); Men: more severe victimization
22. Temple et al. (2016)	M = 18.09 years old Schoolchildren N.P. Sampling United States	Current or most recent partner	<ul style="list-style-type: none"> Prevalence Perpetration: 17.8% (1st measure); 17.5% (2nd measure) Victimization: 24% (1st measure); 22.3% (2nd measure) Frequency Perpetration: CDV low frequency (mean score less than 1) Victimization: CDV low frequency (mean score less than 1)
23. Smith-Darden et al. (2017)	6 th - 9 th grade Schoolchildren P. Sampling United States	Partner Last year	<ul style="list-style-type: none"> Prevalence Perpetration: 38%; Higher risk in 9th grade, black students, negative experiences in childhood; Lower risk with participatory parents
24. Muñiz (2017)	15-18 years old Schoolchildren P. Sampling Spain	Partner and former partner	<ul style="list-style-type: none"> Prevalence Perpetration: 8.8%. Non-sig. gender differences Positive relationship of CDV with family conflict and loneliness
25. Smoker y March (2017)	M = 26 years old General population N.P. Sampling Australia	Partner	<ul style="list-style-type: none"> Frequency Perpetration: Increased probability of exercising CDV in women and in participants with higher levels of machiavellianism, narcissism, psychopathy and sadism
26. Ramos et al. (2017)	18-27 years old Undergraduates N.P. Sampling United States	Partner Last year	<ul style="list-style-type: none"> Prevalence Perpetration: 16.3% Frequency Perpetration: Non-sig. gender differences; Positive relationship with aggression in the family, perspective-taking and empathy mitigate this bond
27. Sánchez et al. (2017)	15-21 years old Schoolchildren N.P. Sampling Spain and Mexico	Partner	<ul style="list-style-type: none"> Prevalence Perpetration: >90% control; 70% - 80% jealousy and intrusion (Spain and Mexico) Spain: Non-sig. gender differences; Mexico: more boys in Intrusion Frequency Perpetration: CDV occasionally (mean scores around 1) Non-sig. gender differences
28. Cutbush et al. (2018)	7 th - 8 th grade Schoolchildren United States	Partner Last 6 months	<ul style="list-style-type: none"> Prevalence Perpetration: 13.9% - 32.3%; Non-sig. gender differences Victimization: 24.8% - 50.6%; more victim boys (1st measure). Similar rates in the remaining measures
29. Marganski & Melander (2018)	18-25 years old Undergraduates N.P. Sampling United States	Partner and former partner Last year	<ul style="list-style-type: none"> Frequency Victimization: 73% (according to behavior: 4.1% - 47.4%) CDV is related with psychological, physical and sexual partner violence; CDV increases the risk of offline partner violence

Paper	Sample	CDV	Main results
30. Smith et al. (2018)	14-18 years old School-children Canada	Partner Last year	Prevalence <ul style="list-style-type: none"> ▪ Perpetration: 33% ▪ Non-sig. gender differences; negative relationship with low self-esteem ▪ Victimization: 35.6% ▪ Non-sig. gender differences; Some subtypes are associated with higher Some subtypes are associated with higher levels of psychological distress (especially in girls) ▪ Most (82.5%) who have perpetrated CDV have been victims of CDV

M = Mean; P. Sampling / N.P. = Probabilistic / Non probabilistic sampling; Prevalence = percentage of participants who have exercised / suffered at least some type of CDV; Frequency = regularity of the CDV (mean scores according to number of times, temporality, etc.); Non-sig. = non-significant.

Discussion

The objective of this review study was to analyze the methodology used throughout these years in the evaluation of CDV. In the 59 scientific works analyzed, thirty instruments of CDV measurement were detected.

Of the results obtained, the scarce number of instruments that provide evidence of their psychometric properties stands out, as Borrajo et al., argue (2015b). Some of the published works report on the reliability of the instruments, but there are currently no specific studies on evidence of validity to support their statistical conclusions. These studies would be necessary to ensure that the conclusions obtained are scientifically justified (Prieto & Delgado, 2010). On the other hand, the evidence of validity displayed is mostly from the internal structure, preferably through exploratory factor analyses. In addition to other techniques, such as confirmatory factor analyses, which could reveal specific aspects of measurement models, there are also other sources of evidence of validity (AERA, APA & NCME, 2014) for which scarce information is available.

The instruments of CDV have been used mainly in United States research, which could limit the understanding of this phenomenon in the Spanish population. In addition, it highlights the variety of terms used to refer to the construct, as other works have also pointed out (Gámez-Guadix et al., 2018). The data indicate that there are few international or national studies that include electronic sexual assault or the fraudulent use of this type of content. As previously pointed out (e.g., IEIG, 2017; Rodríguez-Domínguez et al., 2017), other violent practices carried out through technologies would be underestimated, which also has a negative impact on the understanding of this phenomenon.

This systematic review also provides relevant information on the approach to CDV in research. The methodological differences identified (attention to the prevalence or chronicity of the phenomenon, temporality of the aggressions studied, type of relationship analyzed, etc.) make it difficult to compare the studies with each other and are possibly responsible for the plurality of evidence found in this area. It is essential to clarify questions of this type in the studies in order to better interpret the results obtained and better understand the phenomenon.

The findings reviewed do not allow us to conclude with confidence the existence of gender differences in this phenomenon. In addition to the plurality of the methodological approach, another reason could lie in the motives and the type of CDV exercised, as happens in offline violence. In this type of violence, some hypotheses suggest that young women use violence as a form of relief and in a reactive manner, as a response to unacceptable acts by their partners. Young men, on the other hand, use violence as a way of dominating and controlling women (Foshee, Bauman, Linder, Rice & Wilcher, 2007). Similarly, young women express verbal aggressions towards their partners to a greater extent, while young men emphasize physical and sexual aggressions (Harned, 2001; Muñoz-Rivas, Graña, O'Leary & González, 2007). Something similar seems to happen in CDV. An example of this would be the study by Zweig et al., (2013) in which more boys who are sexually abusive and more girls who are victims of general and sexual CDV are identified. Also the recent findings of Smith et al., (2018), which, although similar in terms of prevalence between boys and girls, observed higher levels of psychological distress in female victims, which could be a better indicator of the severity of the abuse, rather than the number of times it occurs.

Among the limitations of this study are those referring to the process of searching for scientific studies and the inclusion criteria that have been considered. Future studies could analyze possible differences according to the degree of commitment in the relationship or the moment in which CDV is exercised.

In conclusion, the evaluation of CDV shows a great methodological diversity, as well as a scarce attention to manifestations of sexual CDV. Although some studies have estimates of the reliability of the measure, a considerable number of them have not been approached from the perspective of validity, which would limit the construction of scientific knowledge in this field. The information obtained in this systematic review is fundamental to understand the possible reasons for the divergence of results about the CDV, since it shows how the methodological approach conditions the interpretation of the evidence found, issues that have to be addressed from the scientific rigor and adequately detailed in the research.

Note.- This work is part of the R+D+I Project entitled "Predictive factors of different forms of violence against

women", REF. B-SEJ-135-UGR18 (Andalusia 2014-2020 ERDF Operational Programme).

References

- Aboujaoude, E., Savage, M.W., Starcevic, V. y Salame, W.O. (2015). Cyberbullying: Review of an old problem gone viral. *Journal of Adolescent Health, 57*, 10-18. doi: 10.1016/j.jadohealth.2015.04.011.
- American Educational Research Association [AERA], American Psychological Association [APA], y National Council on Measurement in Education [NCME] (2014). *Standards for educational and psychological testing*. Washington: American Psychological Association.
- *Bennet, D., Guran, E., Ramos, M. y Margolin, G. (2011). College students' electronic victimization in friendships and dating relationships: Anticipated distress and associations with risky behaviors. *Violence and Victims, 26*(4), 410-429.
- *Borrajó, E., Gámez-Guadix, M. y Calvete, E. (2015a). Cyber dating abuse: Prevalence, context, and relationship with offline dating aggression. *Psychological Reports: Relationships & Communications 116*(2), 565-585. doi:10.2466/21.16.PR0.116k22w4.
- *Borrajó, E., Gámez-Guadix, M., Pereda, N. y Calvete, E. (2015b). The development and validation of the cyber dating abuse questionnaire among young couples. *Computers in Human Behavior, 48*, 358-365. doi:10.1016/j.chb.2015.01.063.
- *Burke, S. C., Wallen, M., Vail-Smith, K. y Knox, D. (2011). Using technology to control intimate partners: An exploratory study of college undergraduates. *Computers in Human Behavior, 27*(3), 1162-1167. doi:10.1016/j.chb.2010.12.010.
- Castells, M. y Cardoso, G. (2005). *The network society: From knowledge to policy*. Washington, DC: Johns Hopkins Center for Transatlantic Relations.
- *Cutbush, S. L. (2015). *Teen dating violence perpetration among middle school youth: The role of bullying, sexual harassment, and gender*. Tesis Doctoral inédita. Universidad de Carolina del Norte, Estados Unidos. Recuperado de: <https://goo.gl/sJSK64>
- *Cutbush, S., Williams, J., Miller, S., Gibbs, D. y Clinton-Sherrod, M. (2018). Longitudinal patterns of electronic teen dating violence among middle school students. *Journal of Interpersonal Violence, 1-21*. doi:10.1177/0886260518758326.
- *Dank, M., Lachman, P., Zweig, J. M. y Yahner, J. (2013). Dating violence experiences of lesbian, gay, bisexual, and transgender youth. *Journal Youth Adolescence, 43*(5), 846-857. doi:10.1007/s10964-013-9975-8.
- David-Ferdon, C. y Feldman, M. (2007). Electronic Media, Violence, and Adolescents: An Emerging Public Health Problem. *Journal of Adolescent Health, 41*, S1-S5. doi:10.1016/j.jadohealth.2007.08.020.
- *Dick, R. N., McCauley, H. L., Jones, K. A., Tancredi, D. J., Goldstein, S., Blackburn, S., ... Miller, E. (2014). Cyber Dating Abuse among Teens Using School-Based Health Centers. *Pediatrics, 134*(6), e1560-e1567. doi:10.1542/peds.2014-0537.
- Donoso, T., Rubio, M. J. y Vilà, R. (2017). Las ciberagresiones en función del género. *Revista de Investigación Educativa, 35*(1), 197-214.
- Donoso, T., Rubio, M. J. y Vilà, R. (2018). La adolescencia ante la violencia de género 2.0: Concepciones, conductas y experiencias. *Educación XXI, 21*(1), 109-134, doi:10.5944/educXX15972.
- Donoso-Vázquez, T. (2018). Las ciberviolencias de género, nuevas manifestaciones de la violencia machista. En T. Donoso-Vázquez y A- Rebollo-Catalán (coords.), *Violencias de género en entornos virtuales*, pp. 15-28. Barcelona, España: Ediciones OCTAEDRO, S.L.
- *Drouin, M., Ross, J. y Tobin, E. (2015). Sexting: A new, digital vehicle for intimate partner aggression? *Computers in Human Behavior, 50*, 197-204. doi:10.1016/j.chb.2015.04.001.
- Fernández, A. M. (2008). Propiedades psicométricas de las escalas y cuestionarios objetivos en Psicología: Aspectos a considerar en la construcción, adaptación y utilización de instrumentos psicológicos. En M. Loubat (Ed.), *Diagnóstico Psicológico: más que una Intuición* (pp. 97-126). Santiago: Ediciones PubliFAHU- Editorial LOM.
- Foshee, V.A. Bauman, K.E. Linder, F., Rice J. y Wilcher, R. (2007). Typologies of adolescent dating violence. *Journal of Interpersonal Violence, 22*(5), 498-519.
- Gámez-Guadix, M., Borrajó, E. y Calvete, E. (2018). Partner abuse, control and violence through internet and smartphones. *Papeles del Psicólogo, 39*(3), 218- 227. doi:10.23923/pap.psicol2018.2874.
- Górriz, E. (2016). On-line childgrooming en Derecho penal español. In-Dret, *Revista para el Análisis del Derecho, 3*(3), 1-47. Recuperado de: <https://www.raco.cat/index.php/InDret/article/view/314410/404524>
- Harned, M. S. (2001). Abused women or abused men? An examination of the context and outcomes of dating violence. *Violence and Victims, 16*(3), 269-85.
- Ibarra, E. (2014). Protección de niños en la red: sexting, cyberbullying y pornografía infantil. En I. Luna (coord.), *Estudios aplicados sobre la libertad de expresión y el derecho a la información* (pp. 83-115). México: UNAM, Instituto de Investigaciones Jurídicas. Recuperado de: <https://goo.gl/af3zb8>
- Instituto Europeo de la Igualdad de Género, IEIG. (2017). *La ciberviolencia contra mujeres y niñas*. Recuperado de: <https://goo.gl/JF6LQg>
- Jabaloyas, C. (2015). Las TICs como factor de riesgo de la violencia en parejas adolescentes. *Criminología y Sociedad, 4* (5), 211-264.
- *Leisring, P. A. y Giumetti, G. W. (2014). Sticks and stones may break my bones, but abusive text messages also hurt: Development and validation of the CyberPsychological Abuse scale. *Partner Abuse, 5*(3), 323-341. doi:10.1891/1946-6560.5.3.323.
- *Lyndon, A., Bonds-Raacke, J. y Cratty, A. D. (2011). College students' Facebook stalking of ex-partners. *Cyberpsychology, Behavior, and Social Networking, 14*(12), 711-716. doi:10.1089/cyber.2010.0588.
- *Madlock, P. E. y Westerman, D. (2011). Hurtful cyber-teasing and violence: who' slaughtering out loud? *Journal of Interpersonal Violence, 26*(17), 3542-3560. doi:10.1177/0886260511403749.
- *Marganski, A. y Melander, L. (2018). Intimate partner violence victimization in the cyber and real world: examining the extent of cyber aggression experiences and its association with in-person dating violence. *Journal of Interpersonal Violence, 33*(7), 1071-1095. doi:10.1177/0886260515614283.
- *Martínez-Pecino, R. y Durán, M. (2016). I Love You but I Cyberbully You. The Role of Hostile Sexism. *Journal of Interpersonal Violence, 25*, 1-14. doi:10.1177/0886260516645817.
- Mclaughlin, J. H. (2010). Crime and Punishment: Teen Sexting in Context. *Penn State Law Review, 115*(1), 135-181.
- *Melander, L. A. (2010). College students' perceptions of intimate partner cyberharassment. *Cyberpsychology, Behavior, and Social Networking, 13*(3), 263-268.
- *Muñiz, M. (2017). Violencia de pareja online en la adolescencia, clima familiar y escolar desde la perspectiva de género. *Infancia y Aprendizaje, 12-22*. doi:10.1080/02103702.2017.1341101
- Muñoz-Rivas, M. J., Graña, J. L. O'Leary, D. y González, M. P. (2007). Aggression in adolescent dating relationships: Prevalence, justification and health consequences. *Journal of Adolescent Health, 40*(4), 298-304.
- Pérez, P., Flores, F., De la Fuente, S., Álvarez, E., García, L., y Gutiérrez, C. (2011). *Guía sobre adolescencia y sexting: Qué es y cómo prevenirlo*. Instituto Nacional de Tecnologías de la Información y Pantallas Amigas. Recuperado de: <https://goo.gl/KwW7Qi>
- *Picard, P. (2007). *Tech abuse in teen relationships*. Chicago, IL: Teen Research Unlimited. Recuperado de: <https://goo.gl/G3XDDB>
- Prieto, G. y Delgado, A. (2010). Fiabilidad y validez. *Papeles del Psicólogo, 31*(1), 67-74.
- Quesada, S., Fernández-González, L. y Calvete, E. (2018). El sexteo (sexting) en la adolescencia: Frecuencia y asociación con la victimización de ciberacoso y violencia en el noviazgo. *Psicología Conductual: Revista Internacional de Psicología Clínica y de la Salud, 26*(2), 225-242.
- *Ramos, M. C., Miller, K. F., Moss, I. K. y Margolin, G. (2017). Perspective-Taking and empathy mitigate family-of-origin risk for electronic aggression perpetration toward dating partners: A brief report. *Journal of Interpersonal Violence, 1-10*. doi:10.1177/0886260517747605

- *Reed, L. A., Tolman, R. M., y Ward, L. M. (2016). Snooping and sexting: Digital media as a context for dating aggression and abuse among college students. *Violence Against Women*, 22(13), 1556-1576. doi:10.1177/1077801216630143.
- Rodríguez-Domínguez, C., Moreno, E., y Durán, M. (2017). Valoración de chicas adolescentes de la pornografía de venganza: Percepciones de gravedad y culpabilidad. En M. A. García-Carpintero, R. Casado, A. Botello [...] y I. Aguilar (coord.), *Libro de Actas I Congreso Internacional de Género y Salud* (pp. 308-314). Sevilla, España: Universidad de Sevilla.
- Rodríguez-Domínguez, C. (2015). *Ciberacoso en las relaciones entre adolescentes y su reflejo en los medios* (Tesis Doctoral no publicada). Universidad de Huelva, España.
- Rodríguez-Domínguez, C., Martínez-Pecino, R., y Durán, M. (2015). Ciberacoso en la adolescencia y revelación de las agresiones. *Apuntes de Psicología*, 33(3), 95-102.
- *Sánchez, V., Muñoz-Fernández, N. y Ortega-Ruiz, R. (2015). "Cyberdating Q_A: An instrument to assess the quality of adolescent dating relationships in social networks. *Computers in Human Behavior*, 48, 78-86. doi:10.1016/j.chb.2015.01.006.
- *Sánchez, V., Muñoz-Fernández, N., Lucio, L. A. y Ortega-Ruiz, R. (2017). Ciberagresión en parejas adolescentes: Un estudio transcultural España-México. *Revista Mexicana de Psicología*, 34(1), 46-54.
- *Schnurr, M. P., Mahatmya, D. y Basche, R. A. (2013). The role of dominance, cyberaggression perpetration, and gender on emerging adults' perpetration of intimate partner violence. *Psychology of Violence*, 3(1), 70-83. doi:10.1037/a0030601.
- *Smith, K., Cénat, J. M., Lapierre, A., Dion, J., Hébert, M., y Côté, K. (2018). Cyberdating violence: Prevalence and correlates among high school students from small urban areas in Quebec. *Journal of Affective Disorders*, 234(December 2017), 220-223. doi:10.1016/j.jad.2018.02.043.
- *Smith-Darden, J. P., Kernsmith, P. D., Victor, B. G. y Lathrop, R. A. (2017). Electronic displays of aggression in teen dating relationships: Does the social ecology matter? *Computers in Human Behavior*, 67, 33-40. doi:10.1016/j.chb.2016.10.015.
- *Smoker, M. y March, E. (2017). Predicting perpetration of intimate partner cyberstalking: Gender and the Dark Tetrad. *Computers in Human Behavior*, 72, 390-396. doi:10.1016/j.chb.2017.03.012.
- *Strawhun, J., Adams, N. y Huss, M. (2013). The assessment of cyberstalking: an expanded examination including social networking, attachment, jealousy, and anger in relation to violence and abuse. *Violence and Victims*, 28(4), 715-730. doi:10.1891/0886-6708.11-00145.
- *Temple, J. R., Choi, H. J., Brem, M., Wolford-Clevenger, C., Stuart, G. L., Peskin, M.F. y Elmquist, J. A. (2016). The temporal association between traditional and cyber dating abuse among adolescents. *Journal of Youth and Adolescence*, 45(2), 340-349. doi:10.1007/s10964-015-0380-3.
- *Tokunaga, R. S. (2011). Social networking site or social surveillance site? Understanding the use of interpersonal electronic surveillance in romantic relationships. *Computers in Human Behavior*, 27(2), 705-713. doi:10.1016/j.chb.2010.08.014.
- *Tompson, T., Benz, J. y Agiesta, J. (2013). *The digital abuse study: Experiences of teens and young adults*. AP-NORC Centre for Public Affairs Research. Universidad de Chicago. Recuperado de: <https://goo.gl/cKjvJB>
- Torres, C., Robles, J. M. y De Marco, S. (2013). *El ciberacoso como forma de ejercer la violencia de género en la juventud: Un riesgo en la sociedad de la información y del conocimiento*. Ministerio de Sanidad Servicios Sociales e Igualdad. Gobierno de España. Recuperado de: <https://goo.gl/1o69jb>
- Wolak, J., y Finkelhor, D. (2011). *Sexting: A typology*. Durham, NH: Crimes against Children Research Center. Recuperado de: <https://goo.gl/4ga9mC>
- *Wolford-Clevenger, C., Zapor, H., Brasfield, H., Febres, J., Elmquist, J., Brem, M., ...Stuart, G. L. (2016). An examination of the partner cyber abuse questionnaire in a college student sample. *Psychology of Violence*, 6(1), 156-162. doi:10.1037/a0039442.
- Wright, M. F. (2015). Cyber aggression within adolescents' romantic relationships: Linkages to parental and partner attachment. *Journal of Youth and Adolescence*, 44(1), 37-47. doi:10.1007/s10964-014-0147-2.
- *Zweig, J. M., Dank, M., Yahner, J. y Lachman, P. (2013). The rate of cyber dating abuse among teens and how it relates to other forms of teen dating violence. *Journal of Youth and Adolescence*, 42(7), 1063-1077. doi:10.1007/s10964-013-9922-8.
- Zweig, J. M., Lachman, P., Yahner, J. y Dank, M. (2014). Correlates of cyber dating abuse among teens. *Journal of Youth and Adolescence*, 43(8), 1306-1321. doi:10.1007/s10964-013-0047-x.