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## Abstract

The choking game (TCG) is an adolescent activity in which asphyxiation is used to obtain a “high,” occasionally resulting in seizures or death. A plethora of TCG information is available through YouTube, though this content has not been evaluated recently. The current study described TCG as portrayed in YouTube videos and compared views and ratings of TCG videos to unrelated videos. The TCG videos demonstrated diverse methods of asphyxiation, with a minority showing injury to the participants. TCG videos were less likely to be commented on or rated positively than non-choking game videos. TCG prevention videos differed significantly from actual TCG videos in the way they depicted the social context of TCG. Thus, TCG videos are accessible through YouTube, but the prevention materials available on YouTube are not accurate or representative. Accurate and educational online prevention materials should be created to decrease the occurrence of TCG.

## Keywords

Asphyxiation, prevention, social media, the choking game, YouTube

The choking game (TCG) is a dangerous activity engaged in by a significant minority of preadolescents and teenagers in numerous countries, with estimates of lifetime prevalence of engagement falling consistently between 7% and 12%, with the highest estimate to date being 17%.<sup>1–8</sup> TCG is described by the Centers of Disease Control and Prevention as strangulation inflicted by oneself or another person to achieve a brief period of euphoria due to a lack of oxygen in the brain.<sup>8</sup> The potential for temporary euphoria makes this risky activity appealing to thrill-seeking adolescents.<sup>3</sup> Such a sensation comes at a high cost, however, with dangers of participation including chronic headaches, short-term memory loss, seizures, concussions, stroke, brain damage, and death.<sup>2,3,5,9</sup> The incidence of such risks increases significantly if the individual engages in this behavior when alone, which is reported by 1.5% of adolescents.<sup>3</sup> A number of physiological responses, particularly seizure activity, can be observed in the myriad Internet videos of adolescents participating in TCG.<sup>10</sup> Although the potential consequences of TCG are severe, nearly 40% of adolescents in one nationwide survey reported that they saw few to no risks associated with participation in TCG.<sup>6</sup>

In contrast to this perception, the Centers for Disease Control and Prevention reports that there have been 82 deaths due to TCG from 1995 to 2007.<sup>8</sup> Advocacy groups

suggest that this estimate is quite low and that as many as 100 choking game-related deaths occur annually ([www.cultureofsafety.com/safety-tips/the-choking-game/](http://www.cultureofsafety.com/safety-tips/the-choking-game/)), with many of these deaths being labeled as suicides. The high rate of death and other significant physiological consequences is particularly alarming given the documentation of such occurrences in various social media outlets. Prior work by Linkletter and colleagues<sup>10</sup> identified 65 videos on YouTube of adolescents engaging in TCG. The authors also identified a clear link between the technique used in the videos and the occurrence of adverse events. Specifically, when adolescents used a “sleeper hold,” seizures were observed in over three quarters of the videos. In total, the 65 YouTube videos of TCG were viewed nearly 200 000 times, allowing hundreds of thousands of adolescents to view this dangerous behavior. One particular concern raised by Linkletter and colleagues is that viewing such risk-taking behaviors on the Internet may normalize the behavior and increase the likelihood that

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adolescents participate in TCG. In a recent review of TCG, Busse and colleagues<sup>3</sup> argue that, while TCG participation appears to be clustered into several regions globally, rapidly increasing access to social media may promote the spreading of TCG to other areas of the world.

To date, the study by Linkletter and colleagues<sup>10</sup> is the only systematic evaluation of TCG videos on social media, specifically YouTube. YouTube has attracted over 1 billion users since its inception, with viewers watching more hours every month, a trend that has been steadily increasing by roughly 50% from one year to the next.<sup>11</sup> In fact, 300 new hours of video are uploaded each day. Thus, because the use of social media has risen in the 5 years since the publication of work of Linkletter and colleagues,<sup>10</sup> it is highly likely that the availability of TCG videos has similarly increased. The current study sought to update the estimate of the availability of TCG videos through YouTube as well as to characterize the nature of TCG videos and the response of viewers to these videos. Because of the significant health risks associated with participation in TCG and concern that this behavior may spread to more countries,<sup>3</sup> it is important to be aware of what information is readily available to youth at risk of participating in this dangerous activity.

## Methods

### *Video Inclusion Criteria*

All videos were viewed and included in subsequent analyses if TCG was discussed or shown. All other videos were coded as unrelated. Non-English videos were excluded from the current study.

### *Procedure*

A retrospective content analysis was conducted via YouTube. Most of the search terms used in the current study were obtained from the Orlando Sentinel and additional terms commonly used in TCG research, including the following: The Choking Game; Space Cowboy; Space Monkey; Funky Chicken; Pass-out Game; American Dream; Blackout; Tingling; Breath Play; Choke-Out; Dream Game; Fainting Game; Suffocation; Roulette; Flatliner; California High; Airplaning; Gasp; Faint Challenge; Faint Game; Knockout Challenge; Choking Game Instructions; Pass-out; Pass-out Challenge; and Knockout Game.<sup>12,13</sup> Each term was searched on March 13, 2015, using the standard search parameters for YouTube. Up to the first 100 videos for each term were recorded (2058 in total) and then analyzed between March 26 and April 8, 2015. At the time of this analysis, some

video links were no longer valid, leaving 1857 videos. The remaining videos were then sorted into those relevant to TCG (419) and irrelevant to the choking game (1438).

A data collection form was used to record information about each video, such as number of views, upload date, whether the video was related to TCG, number of “thumbs up” ratings, number of “thumbs down” ratings, and the number of comments. Additionally, a number of qualitative aspects of TCG videos were coded to 100% agreement by 3 research assistants.

### *Coding Scheme*

Videos were coded as for prevention purposes if there was any mention of reasons for not engaging in TCG or if they encouraged people to resist participating in TCG. Gender was coded when unambiguous; if there was any uncertainty, gender was coded as “unclear.” Other gender codes for participants, spectators, or assistants included female, male, or mixed when multiple people of either gender were present. Seizures were endorsed if the choking game participant began to visibly convulse, shake, or twitch after passing out. The presence of other injury was coded if the participant hit their head on losing consciousness. The number of observers were coded based on who could be seen on the video or if it was clear there was a person holding the camera (eg, the image was mobile or someone was talking who was out of sight). Location was coded as private if it appeared to be a residential environment. All other locations were coded as public (eg, outside, school). Additionally, videos were coded based on whether someone was actually participating in TCG and, if so, what techniques were shown in the video (sudden standing, use of a ligature, pressure on the neck, pressure on the chest, use of the “sleeper hold,” hyperventilation, and breath-holding). Coding of asphyxiation techniques was based on the techniques identified by a recent qualitative review of self-asphyxial behaviors.<sup>3</sup> On occasion, multiple techniques were used in the video and in these cases all techniques observed were coded.

### *Data Analytic Plan*

Video data were compiled by 3 research assistants directly from YouTube. Descriptive data were used to characterize the nature of each TCG-related video. A one-way ANOVA was used to compare the number of views, ratings, and comments between TCG-related and other videos. Chi-square tests were used to identify significant differences in the frequency of individual techniques, gender of participants, spectators, and assistants,

**Table 1.** ANOVAs Comparing the Chocking Game (TCG) Videos to Unrelated Videos and Prevention-Oriented Videos.

Outcome	Group	Mean	SD	df	F	P
Views	TCG	53115.69	159058.54	(1, 1855)	2.635	.10
	Unrelated	724635.99	8465229.49			
Thumbs Up	TCG	229.11	1317.98	(1, 1855)	5.321	.02
	Unrelated	3220.69	26532.33			
Thumbs Down	TCG	47.66	179.25	(1, 1855)	2.692	.10
	Unrelated	131.15	1036.87			
Comments	TCG	81.09	392.54	(1, 1855)	5.138	.02
	Unrelated	675.79	5365.35			
Views	Nonprevention	15543.94	60766.50	(1, 405)	33.99	.00
	Prevention	152642.76	264648.57			
Thumbs Up	Nonprevention	179.92	1467.67	(1, 405)	0.900	.40
	Prevention	383.15	952.51			
Thumbs Down	Nonprevention	20.04	58.06	(1, 405)	14.07	.00
	Prevention	112.09	301.74			
Comments	Nonprevention	41.03	384.07	(1, 405)	5.99	.00
	Prevention	195.33	430.17			

as well as the occurrence of physical injuries. Furthermore, gender differences based on TCG context and techniques used for asphyxiation were analyzed in a final set of  $\chi^2$  analyses. An a priori power analysis for a sample size of 500 videos, a moderate effect size ( $f = .30$ ), and  $\alpha = .05$  identified the power as 0.98, which was adequate for the current analyses.

## Results

Using the full list of terms identified by the popular press, as well as several additional terms commonly used in academic work,<sup>12,14</sup> 419 choking game-related videos were identified and characterized. See Table 1 for full ANOVA results comparing TCG videos to non-TCG videos. When compared to videos that did not depict TCG, TCG videos received fewer “thumbs up” ratings,  $F(1, 1855) = 5.321, P = .021$ . TCG videos were also less likely to be commented on,  $F(1, 1855) = 5.138, P = .024$ . No significant difference was found between TCG and unrelated videos with regard to the mean number of views or “thumbs down” ratings (Table 1).

Of the videos related to TCG, only 25% appeared to be intended to prevent future participation. See Table 1 for full results of an ANOVA comparing prevention-oriented to nonprevention-oriented videos. Notably, prevention videos had a higher mean number of views relative to nonprevention videos,  $F(1, 405) = 33.99, P < .001$ . Prevention videos did, however, receive more “thumbs down” ratings than nonprevention videos,  $F(1, 405) = 14.07, P < .001$ . Prevention videos on average also had more comments than nonprevention TCG videos,  $F(1, 405) = 5.995, P = .003$ . No significant difference was

found between the number of “thumbs up” ratings of nonprevention videos compared to prevention videos (see Table 1). Such results indicate that, while prevention-oriented TCG videos are viewed more often, they are not reviewed as positively as noncautionary TCG videos.

Largely, the videos were filmed by groups of adolescents in private locations, depicting TCG as a group recreational activity. See Table 2 for a full presentation of video characteristics. Nearly 80% of the videos, including those intended to be cautionary, included footage of adolescents participating in TCG. The most common asphyxiation techniques shown included moving quickly from a seated or prone position to standing in combination with hyperventilation and breath holding. Nearly half of the participants shown in the videos whose gender could be clearly identified were male (57%) compared to 34% female. Additionally, 62% of those assisting with inducing asphyxiation whose gender could be clearly identified were male. The gender of spectators was more diverse, with 29% being exclusively male groups, 14% exclusively female, and 12% mixed gender. Of note, males were significantly more likely to use a sleeper hold than females ( $\chi^2 = 14.72, P = .005$ ). Just over half of the videos showed TCG participants in a private location (ie, a private residence). One fourth of the videos did, however, show TCG occurring in a public location, such as school property or public sidewalks (Table 2). A minority of videos showed injury to the participants, including possible seizures demonstrated by convulsions. One third of the videos showed spectators making an attempt to catch the participant as they lost consciousness.

**Table 2.** Frequency and Percentages of Descriptive Data Characterizing the Choking Game (TCG) Videos.

Variable		n	Percentage
Prevention oriented	No	291	71
	Yes	106	26
Shows TCG	No	76	18
	Yes	329	78
Asphyxiation	Ligature	3	1
	Sudden standing	247	74
	Sleeper hold	31	9
	Hyperventilation	249	75
	Holding breath	265	80
	Pressure on neck	35	10
	Pressure on chest	130	39
Gender of participants	Male	189	45
	Female	111	26
	Mixed	29	7
Gender of assistant	Male	127	30
	Female	56	13
	Unclear	4	1
	Mixed	22	5
	None	121	29
Gender of spectators	Male	120	29
	Female	58	17
	Unclear	33	8
	Mixed	50	12
	None	68	16
Injury	None	189	45
	Hit object	42	10
	Seizure	96	23
Caught	No attempt	169	40
	Attempt	131	31
Setting	Public	103	25
	Private	219	52

Several significant differences between prevention and nonprevention videos emerged on further analysis. Specifically, prevention videos were significantly less likely to depict adolescents actually participating in TCG than nonprevention videos ( $\chi^2 = 195.61, P < .001$ ). Prevention videos also showed adolescents using different techniques than the nonprevention videos. Namely, prevention videos were less likely to show participants moving quickly from a seated or squatting position to standing ( $\chi^2 = 14.42, P < .001$ ) or pressing on their chest ( $\chi^2 = 27.80, P < .001$ ) and more likely to show hyperventilation ( $\chi^2 = 11.45, P = .002$ ) and breath holding ( $\chi^2 = 7.05, P = .010$ ). The representation of the gender of participants in prevention videos also did not represent the gender observed in nonprevention videos, with prevention videos showing significantly more females than nonprevention videos ( $\chi^2 = 62.02, P < .001$ ). Prevention videos also showed TCG occurring in a public location

far more often than nonprevention videos ( $\chi^2 = 22.77, P < .001$ ). Overall, while prevention videos had a higher mean number of views, they were rated less positively than nonprevention TCG videos and showed TCG occurring in a significantly different social contexts.

## Discussion

The current study sought to analyze and describe currently-available TCG YouTube videos. Overall, 419 videos pertaining to TCG were found from over 1800 videos that were also identified using common TCG-related keywords. Videos about TCG were less likely to be rated positively and less likely to be commented on than non-TCG videos. Prevention-specific videos were then compared to nonprevention TCG videos. These prevention videos had a higher mean number of views, but also received more “thumbs down” ratings on average. Prevention videos also differed from other TCG videos in their portrayal of the social context of TCG as well as the methods of asphyxiation depicted.

Only one prior such study characterized the portrayal of TCG on YouTube reviewing only a fraction of the amount of videos examined in the present study.<sup>10</sup> Specifically, based on the videos reviewed by Linkletter and colleagues, the number of YouTube videos available about TCG has increased by 400% in just 5 years. Furthermore, choking game-related videos were viewed over 22 million times, which is a stark increase from the 200 000 views reported by Linkletter and colleagues. While this increase in availability and rate of viewing may seem alarming, it is consistent with the rapid growth of social media.<sup>11</sup>

To extend Linkletter and colleagues' work,<sup>10</sup> this study reviewed videos that both depicted and discussed TCG, and subsequently coded the videos as either prevention-related or not. Using this method, a quarter of the videos from this study were found to be prevention-related. These prevention videos were viewed more often than nonprevention videos, potentially suggesting significant public concern about TCG. Prevention videos were also rated more unfavorably than nonprevention videos, as indicated by YouTube's “thumbs down” feature. Furthermore, the differences in prevention video methods and participant gender indicates that there is significant room for growth in future prevention efforts. Notably, many of the prevention videos were home videos recorded using cell-phones and were overwhelmingly not professional or factual. It is currently understood that relatively few parents speak with their children about the risks of TCG,<sup>15,16</sup> but parents who do speak with their children about TCG often report using third-party resources. This observation and the rate at



which prevention videos were viewed supports previous claims that a reasonable starting point in TCG prevention may be producing higher quality and more accurate prevention videos that can be accessed through social media in addition to removing existing nonprevention videos.<sup>3</sup>

Improved prevention interventions can be designed using the descriptive data from this study regarding those persons present, assisting, and participating. Ideally, using these data will help tailor interventions to those adolescents most at risk of participation. Based on the videos reviewed in the current study and consistent with a recent review,<sup>3</sup> TCG appears to occur primarily in groups, composed mostly of males. When there were groups of spectators, these groups were more often all male than mixed-gender or all female, suggesting that prevention efforts should especially target adolescent male social groups. Males were also more likely to induce asphyxiation using a “chokehold,” which Linkletter and colleagues<sup>10</sup> indicated was associated with a higher risk of serious neurological side effects. Furthermore, most videos were filmed in private locations suggesting a possibility that prevention techniques aimed at informing parents or caregivers about TCG, and assisting in methods of increasing adolescent supervision, may be most effective in decreasing choking game participation.

Using existing videos as prevention materials may not be adequate, as many of these videos did not show any kind of injury occurring to the participants and thus may minimize the consequences of participation. The observed rate of injury is likely low given the estimated rates of serious neurological and other physical side effects associated with TCG.<sup>1-9</sup> Additionally, it is concerning that though most of the videos showed multiple persons present during asphyxiation, few videos showed any attempt at catching the participant as they lost consciousness. The apparent lack of safety precautions in the videos reviewed may be due to a lack of concern of the risks of TCG or it may be that adolescents found videos of participants falling more amusing and were more likely to post these online.

As a descriptive study designed to highlight the availability and content of choking game-related videos, this study does have several notable limitations. This study only searched for videos using 25 known terms associated with TCG; however, this list may not be inclusive of all possible common terms for TCG. Furthermore, viewing only the first 100 entries of each YouTube search could have eliminated a significant portion of the total overall choking game-related videos available on the Internet. Additionally, limiting the videos viewed to those that appeared related to our keywords in an initial

search may not represent the ways that adolescents identify TCG-related videos in natural circumstances. Based on these limitations, the current study likely significantly underestimates the availability and accessibility of TCG content on YouTube. Despite this limitation, the nature of the videos coded in this study can provide insight into how people engage in the TCG in a naturalistic setting, such as location, gender of persons involved, and methods of asphyxiation, as well as how much the availability and viewing of this content has changed in the last five years. Given the wealth of information gathered from YouTube about how TCG occurs in a naturalistic setting, future research should move toward developing socially valid and empirically sound prevention materials for adolescents and their parents.

It is clear that since the last methodical analysis of TCG YouTube videos in 2010,<sup>10</sup> the availability of TCG-related materials has increased markedly. While one quarter of TCG videos available are prevention-oriented, these videos do not reflect naturally occurring TCG nor are they particularly well received. Given the significant health risks associated with participation in TCG,<sup>1-9</sup> the drastic increase in choking game-related videos on YouTube within the last five years, and the variety of asphyxial methods in use, prevention efforts are gravely needed. The knowledge gained from the present study can be used to design socially valid and scientifically based prevention materials targeted toward those adolescents most at risk for participating in The Choking Game.

### Author Contributions

EKD: contributed to conception and design; contributed to acquisition, analysis, and interpretation; drafted manuscript; critically revised manuscript; gave final approval; agrees to be accountable for all aspects of work ensuring integrity and accuracy.

JEA: contributed to conception and design; contributed to acquisition and interpretation; drafted manuscript; critically revised manuscript; gave final approval; agrees to be accountable for all aspects of work ensuring integrity and accuracy.

WHD: contributed to conception and design; contributed to interpretation; drafted manuscript; critically revised manuscript; gave final approval; agrees to be accountable for all aspects of work ensuring integrity and accuracy.

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