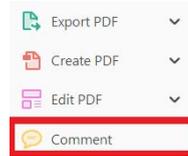


USING e-ANNOTATION TOOLS FOR ELECTRONIC PROOF CORRECTION

Required software to e-annotate PDFs: **Adobe Acrobat Professional** or **Adobe Reader** (version 11 or above). (Note that this document uses screenshots from **Adobe Reader DC**.)
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Once you have Acrobat Reader open on your computer, click on the **Comment** tab (right-hand panel or under the Tools menu).

This will open up a ribbon panel at the top of the document. Using a tool will place a comment in the right-hand panel. The tools you will use for annotating your proof are shown below:



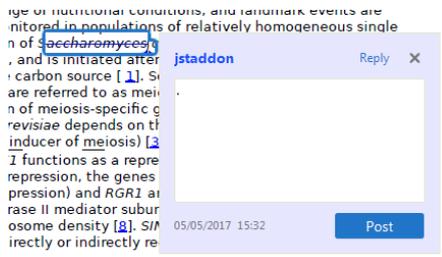
1. Replace (Ins) Tool – for replacing text.

 Strikes a line through text and opens up a text box where replacement text can be entered.

How to use it:

- Highlight a word or sentence.
- Click on .
- Type the replacement text into the blue box that appears.

Experimental data if available. For ORFs to be had to meet all of the following criteria:



2. Strikethrough (Del) Tool – for deleting text.

 Strikes a red line through text that is to be deleted.

How to use it:

- Highlight a word or sentence.
- Click on .
- The text will be struck out in red.

Experimental data if available. For ORFs to be had to meet all of the following criteria:

1. Small size (35–250 amino acids).
2. Absence of similarity to known proteins.
3. Absence of functional data which could not be the real overlapping gene.
4. Greater than 25% overlap at the N-terminus terminus with another coding feature; over both ends; or ORF containing a tRNA.

3. Commenting Tool – for highlighting a section to be changed to bold or italic or for general comments.

 Use these 2 tools to highlight the text where a comment is then made.

How to use it:

- Click on .
- Click and drag over the text you need to highlight for the comment you will add.
- Click on .
- Click close to the text you just highlighted.
- Type any instructions regarding the text to be altered into the box that appears.

informal invariance: [1] or A: Math. Gen., Vol. 12, N



lified theory for a matrix. 'ol. 8, 1984, pp. 305–323. d manuscript, 1984. ching fractions for D0 → K+K relation in D0 decays' Phys

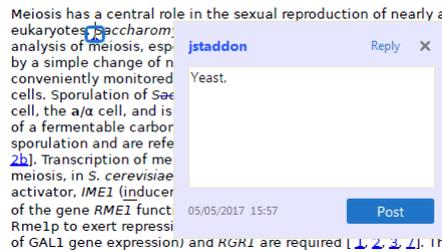
4. Insert Tool – for inserting missing text at specific points in the text.

 Marks an insertion point in the text and opens up a text box where comments can be entered.

How to use it:

- Click on .
- Click at the point in the proof where the comment should be inserted.
- Type the comment into the box that appears.

Meiosis has a central role in the sexual reproduction of nearly all eukaryotes. Saccharom: analysis of meiosis, esp by a simple change of n conveniently monitored cells. Sporulation of Sac cell, the a/a cell, and is of a fermentable carbon sporulation and are refe [2b]. Transcription of meiosis, in S. cerevisiae activator, IME1 (inducer of the gene RME1 funct Rme1p to exert repress of GAL1 gene expression) and HGR1 are required [1, 2, 3, 4]. These ge



USING e-ANNOTATION TOOLS FOR ELECTRONIC PROOF CORRECTION

5. Attach File Tool – for inserting large amounts of text or replacement figures.

 Inserts an icon linking to the attached file in the appropriate place in the text.

How to use it:

- Click on  .
- Click on the proof to where you'd like the attached file to be linked.
- Select the file to be attached from your computer or network.
- Select the colour and type of icon that will appear in the proof. Click OK.

The attachment appears in the right-hand panel.

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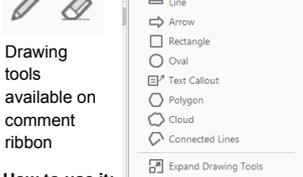
6. Add stamp Tool – for approving a proof if no corrections are required.

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How to use it:

- Click on  .
- Select the stamp you want to use. (The **Approved** stamp is usually available directly in the menu that appears. Others are shown under *Dynamic, Sign Here, Standard Business*).
- Fill in any details and then click on the proof where you'd like the stamp to appear. (Where a proof is to be approved as it is, this would normally be on the first page).

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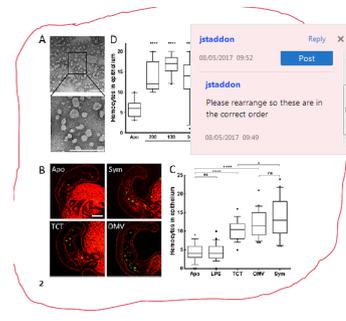


7. Drawing Markups Tools – for drawing shapes, lines, and freeform annotations on proofs and commenting on these marks.

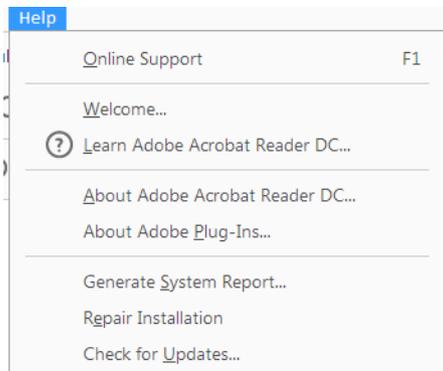
Allows shapes, lines, and freeform annotations to be drawn on proofs and for comments to be made on these marks.

How to use it:

- Click on one of the shapes in the **Drawing Markups** section.
- Click on the proof at the relevant point and draw the selected shape with the cursor.
- To add a comment to the drawn shape, right-click on shape and select **Open Pop-up Note**.
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11	AUTHOR: Ferguson, 2015 has not been included in the Reference List, please supply full publication details.	
12	AUTHOR: Please suggest whether the term “non-significant” can be changed to “nonsignificant” as per the dictionary in the sentence “The overall effect size was near zero ($r = .034$ with correction for publication bias) and non-significant.”	
13	AUTHOR: Please suggest whether the term “pre-post” can be changed to “before and after” in the sentence “It may be worth examining better ways to analyze pre-post aggregate data based on raw number of suicides”.	
14	AUTHOR: Please check the hierarchy of heading levels.	
15	AUTHOR: Please provide the volume number, page range for reference Thompson et al. (2018).	

13 Reasons Why Not: A Methodological and Meta-Analytic Review of Evidence Regarding Suicide Contagion by Fictional Media

CHRISTOPHER J. FERGUSON, XXX

For decades, policymakers and suicide prevention advocates have questioned whether exposure to media with suicide themes, whether television, movies, or music, could increase suicide risk among youth. To date, no clear picture has emerged, with data inconsistent. Two broad forms of data consider the issue, namely society-level aggregate data, and data from smaller correlational and experimental studies. The current article examined the evidence for suicide contagion by fictional media with a methodological and meta-analytic review. Results suggest that current data do not support the theory that suicide contagion by fictional media occurs. It is recommended that individuals exercise caution in public statements linking suicide-themed fictional media to suicide contagion as data may not be able to support such claims.

In the summer of 2017, the release of the popular and critically praised television show *13 Reasons Why* caused significant public consternation. The television show portrays the suicide and aftermath of a teenage girl who documents her motives for the suicide in a series of messages to other teens. Many members of the mental health and suicide prevention community criticized the show for allegedly glorifying suicide and increasing suicide risk among teen viewers. The Society for the Prevention of Teen Suicide (2017) released a statement claiming, “Unfortunately, the media tends to glamorize and sensationalize suicide.” The National Association of School Psychologists (2017) released a statement noting, “We do not recommend that vulnerable youth, especially those who have any degree of suicide ideation,

watch this series. Its powerful storytelling may lead impressionable viewers to romanticize the choices made by the characters and/or develop revenge fantasies.” Numerous other clinicians, educators, and suicide prevention advocates followed suit, expressing concerns about the show (Figure 1).

Concerns about *13 Reasons Why* mirror historical apprehensions regarding the potential impact of suicide-themed media on youth. A family brought a lawsuit against performer Ozzy Osbourne in the 1980s, claiming his song *Suicide Solution* (which did not, in fact, advocate suicide) contributed to their son’s suicide. The lawsuit was dismissed in 1988 (History.com, 2018). Other 1980s rock and metal bands such as *Judas Priest* also faced lawsuits or controversy related to alleged suicide-themed lyrics (Rohter, 1990). All these

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An early version of these analyses was presented at the American Psychological Association’s Technology, Mind and Society conference in April, 2018.

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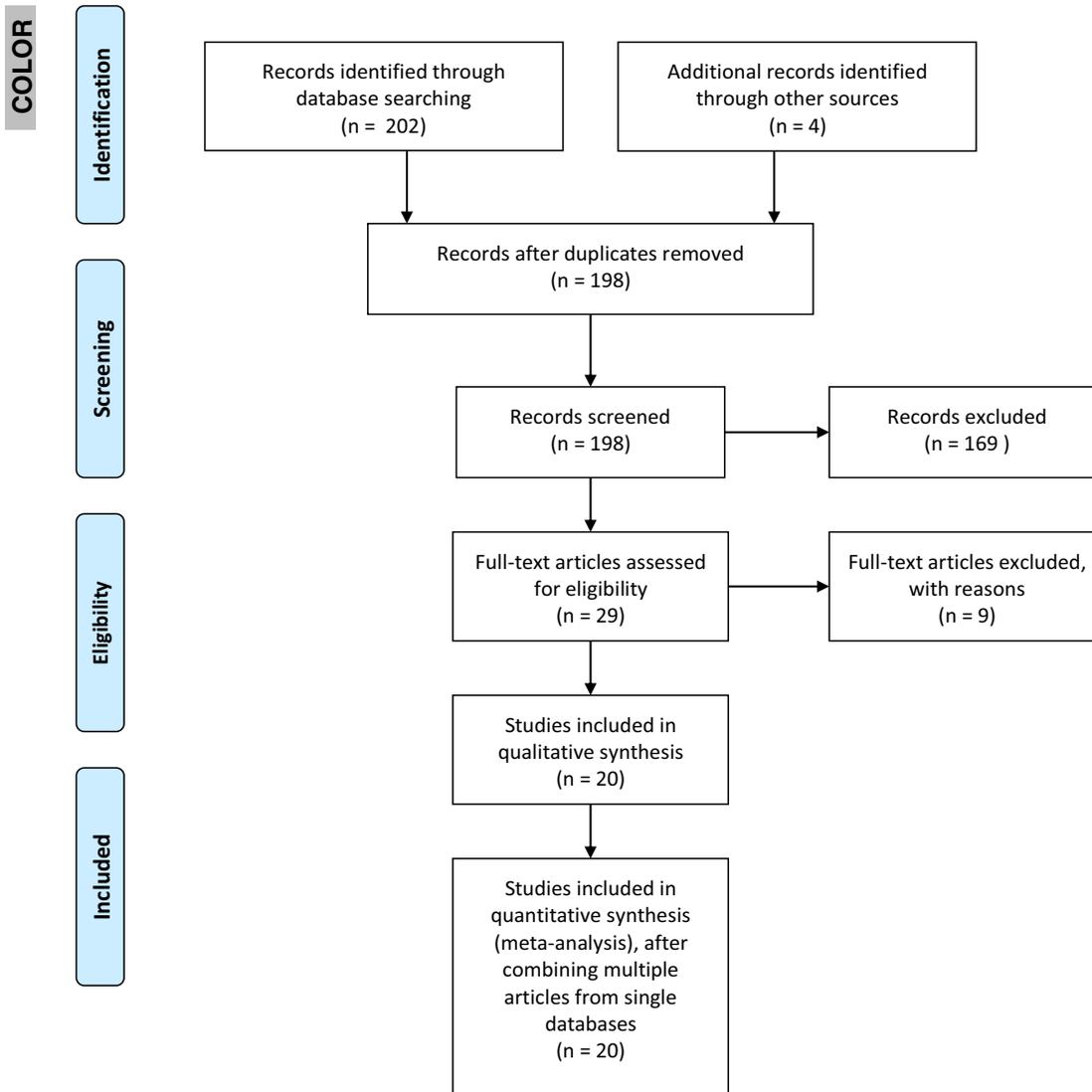


Figure 1. PRISMA Flow Diagram.

phenomena appear related to the Werther Effect, named after the lead character of Goethe's 1774 novel that was thought to have provoked a series of copycat suicides throughout Europe (Hittner, 2005).

Nonetheless, the majority of these societal-level concerns have progressed mainly through speculation. For instance, most of the public statements by professional groups, advocacy groups and individual counselors, educators, and advocates were not

connected to a larger base of empirical data. This leaves open the question as to the degree that concerns about suicide contagion by fictional media are connected to peer-reviewed data.

Studies on suicide contagion by fictional media can be conceptualized as coming from two distinct evidence bases, each with their benefits and pitfalls. The first of these are population aggregate studies. These typically involved pre/post analyses of suicide

1 rates in a municipality before and after a
 2 particular television show with suicide themes
 3 is viewed within the community. The second
 4 are more traditional psychological studies,
 5 most of which may be survey based, asking
 6 participants about their history viewing cer-
 7 tain shows or listening to certain songs and
 8 correlating these with surveys of mood or sui-
 9 cidal thoughts. Some studies may employ
 10 short-term experiments to examine how ran-
 11 domized exposure to different media influ-
 12 ences mood or suicide acceptance. In the
 13 following section, each of these forms of stud-
 14 ies is briefly reviewed.

Aggregate designs

8 As noted above, aggregate designs
 9 examine suicide rates pre/post the airing of a
 10 particularly popular suicide-themed televi-
 11 sion show. Such research designs appear to
 12 have been particularly popular during 1980s
 13 when the limited availability of multiple
 14 channels likely made it more realistic to iso-
 15 late single television shows. Such designs have
 16 obvious appeal as they appear to be able to
 17 examine the direct impacts of a particular
 18 show. They also avoid demand characteristics
 19 that may be common for survey-based
 20 research.

21 That said, such designs have significant
 22 limitations. First, particularly in an environ-
 23 ment in which pressure to publish findings is
 24 prevalent, false-positive results could reify
 25 ecological fallacies. Simkin, Hawton, White-
 26 head, Fagg, and Eagle (1995) note that such
 27 studies cannot affirm that suicide victims
 28 actually had seen the show in question and
 29 that this is an assumption. Unsound method-
 30 ologies might accidentally create false-posi-
 31 tive results based on fairly random
 32 fluctuations in suicide rates. Second, the
 33 description of analyses in many of the older
 34 studies is arguably vague. For example, Gould
 35 and Shaffer (1986) appear to use independent
 36 sample *t* tests (as well as Mann–Whitney *U*
 37 alternatives) to assess before/after differences,
 38 treating time blocks rather than individuals as
 39 the unit of analysis. This statistical analytic
 40 approach could create a higher amount of

unreliability in the analyses, which may
 explain why effect sizes in this field tend to be
 particularly heterogeneous.

9 As noted results for this type of analysis
 are highly divergent. Some studies appear to
 document fairly strong suicide contagion
 effects (e.g. Gould & Shaffer, 1986; Stack,
 Gundlach, & Reeves, 1994), whereas others
 have claimed no effects for fictional media
 suicide contagion (Phillips & Paight, 1987;
 Simkin et al., 1995). Thus, a consistent body
 of evidence does not appear to emerge from
 this group of studies. Interestingly, after the
 mid-90s, this type of study appears to have
 declined altogether, perhaps related to
 increased difficulties in isolating the effect of
 single media examples, given increased diver-
 sification of the media environment.

Traditional psychology studies

More traditional studies examine lim-
 ited samples of individuals, often by conduct-
 ing surveys of media use and suicidal thoughts
 or depression. Although the topic matter
 lends itself well to survey-based research,
 some experiments may consider short-term
 impact on milder variables such as positive
 beliefs about suicide or mood (Till et al.,
 2011). Such studies may naturally vary quite
 widely in quality. As one major issue, the pair-
 ing of questions related to media to questions
 related to mood or suicide may lead to
 hypothesis guessing/demand characteristics
 and false-positive results. It is possible, partic-
 ularly in correlational studies, that bivariate
 correlations may be a poor index of actual
 effect sizes due to potential third variables. In
 most cases, theoretically important third vari-
 ables may explain any bivariate correlation
 between two variables and, as such, theoretic-
 ally derived multivariate analyses are often
 perceived as more valuable than are bivariate
 analyses (Furuya-Kanamori & Doi, 2016;
 Savage & Yancey, 2008). For example, it may
 be possible that females harbor more suicidal
 thoughts and greater depression and are also
 more drawn to storylines such as those in *13*
Reasons Why. Thus, controlling for gender
 effects would be critical. Other variables

related to personality, such as neuroticism, family environment, and even genetics (e.g. Schwartz & Beaver, 2016), could be important to consider.

As with aggregate studies, evidence from traditional psychological studies appears to be mixed. Some studies do show correlations between suicide-themed media and increased suicide risk or decreased mood (Martin, Clarke, & Pearce, 1993; Stack, Kral, & Borowski, 2014). However, other studies have not replicated this effect (Lacourse, Claes, & Villeneuve, 2001; Till et al., 2011). Thus, as with aggregate data, a descriptive look at the evidence base does not reveal a consistent set of evidence for effects, one way or another.

The current study

Given that individual studies demonstrate considerable heterogeneity in regard to the degree that they provide evidence for suicide contagion by fictional media, it may be worth examining the issue from a meta-analytic perspective. Although meta-analysis does not necessarily negate heterogeneity between studies, it can sometimes provide a sense for the trajectory of a field as well as whether some methodological factors may influence effect sizes. To date, this field appears not to have been subjected to meta-analytic review. Therefore, the current article will provide a methodological and meta-analytic summary of the field of fictional media suicide contagion to date.

METHODS

Selection of studies

Identification of relevant studies involved a search of the PsycINFO, MedLine, and Digital Dissertations databases using the search terms (“film* OR movie* OR television OR music”) AND (suicide) AND (Youth OR adolescent* OR child*) as subject searches. In addition, recent reviews of the fictional media suicide contagion literature were examined for

articles that may have been missed in the literature search. Included studies had to meet the following criteria:

- 1 Each study had to measure the influence of some form of media on an outcome related to suicide behavior, suicide ideation, or depressed mood. Media variables generally involved suicide-themed television and movies as well as heavy metal music with suicide themes. General time spent on media was not included as a predictor variable given such studies had the potential to underestimate effects if media exposure did not capture suicide themes in media specifically.
- 2 Each study had to present statistical outcomes or data that could be meaningfully converted into effect size “*r*.”
- 3 A given sample was included only once in the meta-analyses to maintain independence. Some samples, including longitudinal studies, may produce multiple publications, but only one such study was included in the current analysis. In each case, the most conservative estimates of effect were included.

The initial search (carried out in September 2017) returned approximately 202 hits, the majority of which were either non-empirical, considered general media use rather than media suicide specifically or otherwise did not meet the inclusion criteria above. Employing the inclusion criteria, the final search netted 20 published papers. However, it is worth noting that two papers utilized the same sample, however, with different forms of media, namely television versus heavy metal (Till, Tran, Voracek, & Niederkrotenthaler, 2016; Till, Tran, Voracek, Sonneck, & Niederkrotenthaler, 2014). When calculating overall effect sizes, this sample was not included twice to maintain independence. Total participants $n = 12,912$. The list of studies along with effect size estimates is presented in an online table at: <http://www.christopherjferguson.com/Suic>

1 ideContagion.xlsx. Details on data extracted
2 from each article are described below under
3 effect size estimates and moderator analyses.

4 *Effect size estimates*

5
6
7 In line with recent innovations related
8 to meta-analyses of multivariate analyses, the
9 current paper makes use of effect sizes in the
10 metric of r which are based upon multivariate
11 analyses resulting in standardized regression
12 coefficients (betas). Many meta-analyses in
13 prior years had relied upon bivariate r in the
14 hopes that using r rather than betas would
15 result in more homogeneous analyses. How-
16 ever, due to the fact that most studies vary
17 widely in measurement, analytics, and sam-
18 ple, recent analyses have revealed that bivar-
19 ate r s are no more homogeneous than are
20 betas (Ferguson, 2015; Furuya-Kanamori &
21 Doi, 2016), thus removing the primary argu-
22 ment for meta-analyses relying on r . By con-
23 trast, reasons for a preference for betas in
24 meta-analysis are numerous, primarily given
25 the concern that bivariate r may return spur-
26 iously high effect size estimates that do not
27 reflect real correlations once important fac-
28 tors are controlled (Pratt et al., 2010; Savage
29 & Yancey, 2008). Use of betas makes more
30 sense theoretically, given that most multivar-
31 iate analyses include theoretically relevant
32 controls. As such, this study employs betas as
33 effect size estimates.

34 In cases where articles presented more
35 than one effect size estimate, they were aggre-
36 gated for an average effect size. Some manu-
37 scripts presented multiple competing
38 statistical models with different effect size
39 estimates, particularly for multivariate analy-
40 ses. When this occurred, the most conserva-
41 tive model was used as the effect size estimate
42 for the controlled analyses. Given the ques-
43 tion of how much variance remains for media
44 effects once other factors are well-controlled,
45 this approach was viewed as valuable.

46 Several moderators were considered as
47 potentially important for the current article.
48 Study year was considered as a moderator, as
49 was the type of study (aggregate or traditional
50 research study). Whether traditional research

studies controlled for third variables was also
coded as was the apparent presence
absence of demand characteristics as evidence
by explicit attempts to reduce them. Studies
were also coded for whether they consider
TV/movies or heavy metal music as media
predictors.

Analysis

The Comprehensive Meta-Analysis
(CMA) software program was used to fit ran-
dom effects models. The potential for publi-
cation bias was assessed using the Tandem
Procedure which looks for concordance
among several funnel-plot-related tests for
bias. This procedure is an empirically demon-
strated, conservative estimating procedure for
assessing publication bias, with low Type I
error rates.

RESULTS

Overall results of the meta-analysis
are presented in Table 1. As indicated,
overall results did not support a relation-
ship between fictional media portrayals of
suicide and suicide behaviors, thoughts or
depressed mood among consumers. The
overall effect size was near zero ($r = .034$
with correction for publication bias) and
non-significant. Slightly more evidence was
found among aggregate studies ($r = .101$)
than among traditional studies ($r = .019$)
although this was tempered by the poten-
tial for publication bias which would
reduce the effect sizes, with estimated cor-
rection to $r = .077$ for aggregate studies. In
this case, the Tandem Procedure returned
inconclusive results. As the Tandem Proce-
dure tends to be quite conservative in
detecting publication bias, high potential
for publication bias is likely and the lower
estimate may be better to use.

The estimate for bivariate effects was
much higher ($r = .234$) than for better con-
trolled effect sizes ($r = -.018$), although the
bivariate effects likewise appeared to be
inflated by publication bias ($r = .049$ when

TABLE 1
Effect Size Estimates For Outcomes Related to Fictional Media and Suicide-Related Outcomes

Predictor	k	<i>r</i>	<i>r_x</i>	<i>p</i> -value	95% C.I.	<i>I</i> ²	PBias
All studies	23	.060	.034	.104	−0.038, 0.105	90.87	Yes
Aggregate studies	9	.101	.077	.016	−0.013, 0.165	81.93	Prob
Traditional studies	15	.019		.694	−0.076, 0.114	89.96	No
Bivariate	8	.234	.049	.001	−0.081, 0.177	82.74	Yes
Controlled	16	−.018		.673	−0.102, 0.066	92.73	No
TV/Movies	14	.020		.691	−0.078, 0.117	94.16	No
Heavy Metal	10	.099	.023	.015	−0.063, 0.107	65.50	Yes

controlled for publication bias). These results highlight the critical value in considering controlled rather than bivariate effects when examining media impacts.

Lastly, effects were slightly higher for heavy metal music ($r = .099$) than for television/movies ($r = .020$). However, heavy metal research likewise appeared to be impacted by publication bias with effect sizes greatly reduced when this was considered ($r = .023$).

Meta-regression also revealed a declining trend for effect sizes across study years ($Q(1) = 63.76, p < .001$). This indicates that evidence for effects has gotten weaker in more recent studies.

In all cases, between-study heterogeneity was quite large. Indeed, effect sizes vary considerably in the field. Thus, although meta-analytic results can confirm lack of clear evidence for effects, cautious should be used in interpreting aggregated effect sizes as “true” population effect sizes.

DISCUSSION

Whether fictional media depicting suicides contribute to youth or adult suicides or depression continues to be hotly debated in the public. As the controversy over *13 Reasons Why* demonstrated, concerns persist that fictional media suicides may prompt imitative behaviors among media consumers. The current meta-analysis examined the existing research in this field for potential evidence.

Overall, results suggested that the current research evidence cannot support the belief that fictional media with suicide themes lead to a suicide contagion among viewers. Although some inter-study heterogeneity existed, better controlled effect sizes suggest that the impact of suicide-themed fictional media on viewer suicide contagion is minimal. Likewise, meta-regression revealed declining effect sizes across study year, suggesting that evidence has weakened over time. This may reflect the “decline effect” in which initial research results prove difficult to replicate over time.

It is important to note that issues of publication bias appeared to be common in the field. Although uncorrected effect sizes were nonetheless weak, even these may be exacerbated by publication bias. Thus, as with other media effects fields, the issue of suicide contagion would likely benefit from a renewed emphasis on preregistered studies that reduce the potential for researcher expectancy effects, as well as a commitment to publishing null studies where they exist.

One methodological issue was difficult to examine, as it was nearly universal. This was the potential for demand characteristics in traditional psychology studies (both correlational and experimental). Although demand characteristics did not appear to result in high effect sizes among most studies in this area, it remains possible that some individual studies might be influenced by demand characteristics. There are likely straightforward ways to

1 reduce demand characteristics in traditional
2 studies, such as through the use of distrac-
3 tor items, surveys, or procedures to make
4 hypothesis guessing more difficult for par-
5 ticipants. Attention to demand characteris-
6 tics on other areas of media effects appears
7 to result in reduced effect sizes (e.g.
8 Whyte, Newman, & Voss, 2016). Thus, it
9 should be something to consider here.

10 The role of aggregate studies as evi-
11 dence appears to be more complex. From
12 an examination of these studies, details
13 were often a bit unclear on how data were
14 analyzed and whether the most appropriate
15 data analytic tools were employed. Time
16 points were typically used as units of analy-
17 ses, which would appear to leave studies
18 poorly powered and unreliable as number
19 of time points was typically too few for
20 time series analyses. It may be worth exam-
21 **13** ining better ways to analyze pre-post
22 aggregate data based on raw number of
23 suicides. Such data may also be particularly
24 prone to a combination of ecological fal-
25 lacy and publication bias. It may be that
26 there are some incidents in which suicides
27 appear to rise after one show, but do not
28 after another, or even appear to decline (in-
29 deed, the full record of aggregate studies
30 supports this pattern.) However, studies
31 that find an effect may be more exciting
32 and more publishable, potentially distorting
33 the academic record (which did, in fact,
34 appear to have some potential issues with
35 publication bias.)

36 These data from heavy metal music are
37 also interesting in light of debates regarding
38 the impact of such music going back to 1980s.
39 Current evidence suggests that the negative
40 impacts of heavy metal music on listeners are
41 minimal. Although the effect sizes were
42 slightly higher than for other forms of media,
43 this was reduced once publication bias was
44 considered. This finding appears to comport
45 reasonably well with other recent evidence
46 suggesting heavy metal music is not harmful
47 to or may even be beneficial to fans of this
48 genre (e.g. Sharman & Dingle, 2015; Thomp-
49 son, Geeves, & Olson, 2018).
50

Results from this study also critically
highlight the importance of using con-
trolled, theoretically relevant, multivariate
analyses when examining media effects. An
overreliance on bivariate correlations can
result in a significant overestimation and
misinterpretation of media effects. Analyses,
including those in meta-analysis, should
focus on controlled effect sizes rather than
bivariate.

Limitations

As with any study, this one has limita-
tions. First, a meta-analysis is only as good
as the studies included within it. As noted
above, the aggregate studies, in particular,
may not always have been designed or ana-
lyzed in the best possible way and this could
influence results from some studies. Related,
demand characteristics were present in
almost all traditional studies. Second,
although this meta-analysis attempts to cor-
rect for publication bias, such attempts
could over or underestimate the amount of
actual publication bias. Nonetheless, the
adjustment estimates are likely closer to the
population effect sizes than are the raw
effect sizes which more clearly may be the
product of publication bias. Third, the cur-
rent meta-analysis did not include unpub-
lished studies. However, as unpublished
studies are not indexed, finding such studies
can be a fraught process and may increase,
rather than decrease bias in some circum-
stances.

Concluding statements

At present, evidence is not able to sup-
port the contention that fictional depictions
of suicide lead to suicide contagion in viewers.
Until such time as more sophisticated studies
with fewer demand characteristics and pre-
registered designs become available, it is sug-
gested that newsmakers and advocates refrain
from making causal attributions regarding
suicide-themed shows such as *13 Reasons Why*
or heavy metal music.

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