

Electronic Supplementary Materials

Table E1. In-Context Phrase review

Moral words	Frequency	Phases	Examples
Care			
love	398869	love this film/movie/story/character; I/i love; I would/just/really/absolutely/do love; I'd love; You'll/you'll love; You will love; love it; you love; love movies/film/films/movie; fell in love with the/this film/movie; love the fact	<p>“You will love this film”</p> <p>“I love the plot twists”</p> <p>“I would love to see a sequel”</p> <p>“I'd love to know what Atkins and Shields think of this now”</p> <p>“You'll love how creative they get with Thor's hammer as well”</p> <p>“If you are an Almodovar fan, you will love it.”</p> <p>“Action fans will love it”</p> <p>“If you love Ferris Bueller, you'll like Better Off Dead”.</p> <p>“I love movies based on true events, especially true crime events.”</p> <p>“I fell in love with the film and have seen it many times”</p> <p>“I, in a way love the fact the film makes the 70's look wicked.”</p>
help	120836	can't/cannot/couldn't/could not help but; I/one/One can't/couldn't/cannot help; it/It doesn't/didn't help; help the film/movie	<p>“Like a car wreck on the side of the road, one can't help but watch.”</p> <p>“I can't help admiring Steven Shainberg's talent. “</p> <p>“it doesn't help that the character's name is distractingly bad.”</p> <p>“The blood help the film become more realistic.”</p>
loved	109325	loved this/the film/movie/story/character; I loved; I absolutely loved/just/especially/really/instantly/particularly/ also/truly/totally loved; I'd/ would have loved; I've loved; loved it	<p>“I have loved this film for a very long time.”</p> <p>“I loved the Wayne character”</p> <p>“I absolutely loved the job done by Roberts as Trevor.”</p> <p>“I'd have loved to have rated it higher.”</p> <p>“I've loved it ever since I started reading the comic when I was 13.”</p> <p>“Even my 6 year old loved it”</p>
care	88802	don't care;	“We don't care anymore what the payoff ‘surprise ending’ is”

		do not care; who/Who cares; didn't care; did not care; do/Do I care; couldn't care less; could not care less	<p>"I do not care for any of the characters." "who cares that it's historically inaccurate." "I just didn't care about anything that happened in this movie, nothing." "I did not care for the weird voodoo and tarot card aspects" "I don't even remember the ending, nor do I care." "Acting is great, but with a script like this u couldn't care less." "I could not care less if Clooney got his ex-wife back or not."</p>
child	72424	child performances/actors/actor/star;	"One of the best child performances ever."
helps	26246	this/This helps; it/It helps; It/it also helps; film helps; helps the movie/film; cast/review/ helps	<p>"This helps build tension during the course of the story." "They have chemistry and it helps all the 85 minutes of this movie." "It also helps that it has an A + cast" "I hope this film helps people realize that we have to continue to banish the old, harmful, and false beliefs that our society held." "What also really helps the movie is its acting." "The cast helps to make the comedy work."</p>
loves	25546	love this/the film/movie/; loves films/movies	<p>"My sister tells me she loves this film." "Hollywood loves films in which "little guys" and "rebels" go up against "big guys" and "Empires"</p>
share	23735	share the screen; fair share	<p>"The drawing robot must have been embarrassed to share the screen with Baron Cohen." "Basically everybody has a fair share of screen time in this movie."</p>
childhood	23653	childhood film/movie/films/movies	"One of my favorite childhood films!"
murder	85948	murder mysteries/mystery/scenes/plot	"If you like murder mysteries then this is the one to watch"
die	39446	die hard; to die for	"I only recommend it to the die hard Psycho fans."
Fair			
honest	36193	to/To be honest; I'll be honest; Let's/let's be honest;	<p>"But to be honest, I didn't really laugh once." "I'll be honest: I watched this because of Amy Adams." "Let's be honest with ourselves please DC fans." "It is shows an honest depiction of life in a West Texas town."</p>

		honest depiction/portrayal/reviews/opinion/attempt	
revenge	33769	revenge thriller/movie/film/movies/films/story/flicks/drama	"I like the revenge thriller genre and I think Gibson does a good job with this."
justice	26040	justice to; movie/film justice; do it justice	"He totally did justice to the role of a psychopath." "The trailers on television do not do this movie justice." "It simply does not do it justice."
law	20264	in law; physics law	"Avoid this movie like you run from your mother in law." "And yes whilst many of the physics laws are bent to suit, aesthetically and as a narrative this film is completely worthy of all praises."
trust	17647	trust me; I don't trust; I trust; trust IMDb	"And trust me, this movie made laugh more than a few times." "I don't trust those critics, so i didn't bother to see the other two." "In Tarantino I trust." "This movie is why we shouldn't trust IMDb top250."
honesty	7352	all honesty; in/In honesty; brutal honesty	"I'm stunned at how bad it is, in all honesty." "Other than that a very good effort and well worth a watch in honesty." "He tells the story with brutal honesty."
steals	16999	steals the show/scene/movie/thunder; steals every scene	"Max Schreck completely steals the show." "But Maria Casares as the Princess of Death steals every scene she's in."
steal	13774	steal the show/scene/movie/thunder; steal every scene	"Olivia though does steal the show in her inimitable style." "As always, he always manages to steal every scene he is in."
stolen	10236	show /movie/film is stolen; stolen the show/movie/film	"But the show is stolen by the excellent DeNiro as the bitter and twisted almost childish bully." "If that guy had two scenes instead of one he'd have stolen the movie."
racist	9658	racist film/movie/show; film/movie is racist	"The Ridiculous 6' (2015) is a very racist film." "First of all the movie is racist toward whites."
stealing	8531	stealing scenes/performances/performance/	"I especially liked Tom Wilkerson and Tilda Swinton both maybe stealing scenes from Clooney."

		stealing the show/the thunder/plot	“Plot is crammed together with the animals stealing the show.”
stole	8038	stole the show/movie; stole every scene/spotlight; stole my time/money	“The baby that played Sunny definitely stole the show.” “The gentleman stole every scene in which he appears.” “Unfortunately I still feel like the movie stole from me, it stole my time.”
lying	7784	lying in/on/around; I'd/would be lying;	“The jazz man's twisted trumpet lying in the driveway.” “I'd be lying if I said I did not cry.”
Loyalty			
family	200872	family movie/film/movies/films/drama/entertainment/ friendly	“I'd suggest this one as a good fit for a family movie night.”
together	145977	film/movie together;	“What holds this film together without a doubt is Ray Liotta.”
wife	117819	my/My wife;	“I think my wife fell asleep to this movie.”
country	45550	country music/song/club/house; cross country	“I am a huge country music fan and big fan of Tim and the excellent soundtrack alone made it worth it.” “Instead, she takes the girl on a number of cross country trips to confuse her super-human abuser.”
familiar*	35404		“DESTINY is filled with familiar faces in every corner.” “Stuck in a familiar coming-of-age plot, Dani spends one summer learning about love, life and loss.” “If you are familiar with the series it will dawn on you who this is.”
company	27966	production/film/entertainment/TV /Disney company	“They are obviously written from paid employees from the production company itself.”
cult	22650	cult classic/hit/comic/films/movies/film/movie/status /classics/flick/scenes/favorite/favourite/fan/fans/f ollowing	“It's this part of the movie that made it a cult classic.”
fellow	18589	my fellow; fellow actors	“For once I am in total disagreement with my fellow users here.” “Johnny Knoxville does a great job of sharing the spotlight with his fellow actors as his character does in the film”
betrayed	3604	I felt/feel betrayed	“Like many who grew up privately indulging the mythology of Episode IV, I felt betrayed by Episode I.”

betrays	1531	movie/film betrays;	“Equally serious is how the movie betrays the tragic greatness of De Vere.”
Authority			
order	32347	in order to/for; out of order; in that order; chronological order;	“The men try to stay together in order to survive the threat.” “The movie is shot out of order and sort of begins with the end.” “the events unfold in that order.” “This story could have been told even better in chronological order.”
respect	32347	in that/this/some/every/any respect; I respect; my respect; with respect to; respect the audience; I have/can/really respect; due respect	“A little bit more effort in that respect would have been good.” “But I respected it wasn't comedy and it was better that way.” “Nicolas Cage is fast re-earning my respect.” “The film proves to a historical one with respect to patronage of audiences of all classes.” “But please ,respect the audience who is paying 250 to 500 for a ticket.” “I have respect for the people that love what Spielberg has done here.” “With all due respect to Yash Chopra this is the worst movie that he had ever directed.”
control	32311	remote control; control freak; quality/creative control; birth/traffic control; control room;	“I thought the remote control car scene was brilliant.” “Dad is a control freak who monitors every aspect of his children's lives.” “I honestly can't believe that passed quality control.” “It does work as effective birth control for big families, though.” Hint: When Thade finds himself in what looks like a control room pay attention to what he sees.”
master	22422	master piece	“This is truly a master piece of Kamal.”
willing	20008	I'm/am/was willing; I'd be willing;	“So bad I'm willing to sue the guys who made that movie.” “I'd be willing to bet he wasn't happy about it.”
traditional	14556	traditional film/movie/films/movies/story/narrative/Hollyw ood/romantic/animation/plot/horror	“His role as Frank, the detective, is in no sense that of a traditional film hero.”

refuses	9242	film/movie/director refuses	“The film refuses to define an essential character trait, or set up any kind of redemptive arc.”
chaotic	4353	chaotic plot/movies/movie/plots/film/story/production/scenes/ending/narrative	“A terrible chaotic plot with a lousy narrative.”
refuse	4313	I refuse	“I refuse to call this the end of the Skywalker saga.”
riot	4098	laugh/comedy riot; is/was a riot; laugh out riot; laugh out loud riot; absolute riot	“This movie is one laugh riot from beginning to end” “Dallas is a riot, and she just adds so much humor to many of the scenes.” “A laugh out riot at 8 out of 10.” “Spaceballs is laugh out loud riot.” “He is an absolute riot!”
refused	3676	I/i refused; I have/had refused; director/producer/producers/writers refused	“I refused to watch it all at once.” “I have refused to go see many of the more recent Disney animated films” “the fact that the director refused to use any CGI and do everything practical really gave a nervous feeling”

Purity

body	48242	body motion/movements/action/gesture/gestures/positions; body guard/guards; body language; body count; a body of; body shop/farms; body double/armor/suit;	“Stiff and seemingly forced mechanical body motions.” “Even his body guards gave obi wan a better fight then grievous did.” “Eye contact and body language often speaks for itself.” “The body count is high even for a Friday the 13th movie.” “With a body of work so impressive, Shutter Island is among captivating company.” “My favorite character was Luigi, Radiator Springs' body shop owner.” “Every single bit of action was obviously shot from afar with a body double.”
pure*	34124		
blood	46792	blood test/tests; blood pressure; blood type/sample/samples;	“She needed to do a blood test, just to prove that it isn't him.” “If you're a liberal, save your money (And your blood pressure) and stay away.”

		in cold blood; new blood;	“Medically, blood type match is required to be an organ donor.” “Man murders, in cold blood, everyone even slightly involved.” “The main cast return and do well, and the new blood are great as well.”
soul	27917	soul of the movie/film/story; the heart and soul	“The soul of the movie is the horse and the girl” “Her final speech was the heart and soul of this movie.”
bloody	18321	bloody hilarious/Mary; bloody hell/funny/stupid	“In this film it's all very tongue in cheek and it's bloody hilarious.” “What the bloody hell did I do wrong to be punished to suffer such a ugly time of watching!”
god	17517	my god/God; Thank god/God; god/God knows; god/God awful; god/God damn/ dammit; for god/God sake; for the love of god/God; dear god/God; good god/God; swear to god/God; god/God mode;	“But my god is it boring” “Thank god it was not one of those romantic comedy trash.” “Why they attack and where they come from only god knows.” “The concept wasn't bad but the execution was god awful.” “He god damn look like Zac Efron.” “Do not watch this show for god sake” “And for the love of god please be fair with giving points to these movies” “Kind of funny, but dear god the plot.” “The acting was okay, but good god the script must have been like ten pages long.” “I swear to god, if a kid who is a fan of the original Wizard of Oz sees this movie, “he/she's gonna cry.” “It feels like a (shooter) video game played on god mode.”
horror*	205196	horror movie/movies/films/flick/film/scenes/fans/genre	“A really good horror movie in every manner.” “In the end, this is a decent horror flick that's worth checking out.” “To call it a horror would be an insult to horror fans.”
waste*	60611	waste of; waste your time	“This was a sad waste of two such promising actors.” “Annoyed that I wasted my evening.” “simply a waste of money and time.”
hell	45444	what/What/how/How/why/Why/who/Who the hell;	“He clearly doesn't know what the hell he's doing.” “Oh my, this was one hell of a ride!”

		hell of; all hell breaks/broke; as hell; hell yeah/no/yes; the hell out; bloody hell;	“She attacks the cops and all hell breaks loose.” “It's slow as hell, dull and shallow.” “The film has a unique concept, does the concept work? Yes, hell yeah.” “The whole bus scene scared the hell out of me.” “well, what the bloody hell he's going on about.”
wasted*	29144		“The good cast is totally wasted.”
garbage*	19316		“Don't get hustled into watching this garbage.” “Unwatchable, terrible piece of garbage.” “The first fifteen minutes are absolute garbage.”
damn*	18158		“No the problem is with the execution of the whole damn thing.” “Even the songs in both the ending credits and music videos were pretty damn good.” “But damn, is it ever funny.”
trash*	16023		“the movies are too expensive for such a hyped piece of trash” “The thing that saves it from total trash is Jennifer Aniston.” “First let me say I really do not want to trash anyone or anything.”
supernatural	13964	supernatural elements/thriller/movie/element/theme/flicks/my stery/romance/comedy/aspects;	“the supernatural elements add nothing to this story.”
clean	12842	clean fun/humor;	“Good clean fun for both children and adults who can handle an imaginative tale.”
raw	11830	raw performance/comedy/acting/performances/materials; movie is raw;	“Charlotte Gainsbourg's raw performance is spellbinding.”
faithful*	8889		“The subject matter is more faithful to the source material.” “But I was expecting a faithful adaption.” “The movie was also pretty faithful to the actual trial from what I could see”
spiritual	7470	spiritual aspect/aspects	“All of these artifacts had this spiritual aspect to them.”

spoil*	14865		<p>“I won't spoil the plot, but I'll say what happened wasn't too comely.”</p> <p>“There's a few minor plot holes too, which I won't spoil.”</p> <p>“It would be criminal to spoil anything, so go in fresh and be delighted.”</p>
rubbish*	10416		<p>“The story was absolutely rubbish and it was also far too violent.”</p> <p>“It's a shame that a series that began so brilliantly is descending into rubbish.”</p> <p>“This film is utter rubbish, from start to finish.”</p>
horrific	10121	<p>horrific scene/attempt/movies/films/movie/film/actors; movie/film is horrific</p>	<p>“The way Evans keeps you in suspense through such horrific scenes is awe-inspiring.”</p> <p>“The movie is horrific not to glorify- but to condemn.”</p>
gross	9689	<p>box office gross; worldwide/domestic gross; gross \$/amount/earning/profits; gross of;</p>	<p>“As I write, the box office gross is closing in on \$300 million worldwide.”</p> <p>“I just hope the 100 million worldwide gross will generate a remake of Xmas Vacation.”</p> <p>“Sadly, this movie didn't even gross \$1 million at the domestic box office.”</p> <p>“The movie also scored at the domestic box-office with a rentals gross of \$1.”</p>

Note. *words deleted from the dictionary; we deleted the word ‘pure’ from the dictionary but added the phrases “so pure”, “pure love”, “pure friendship”, and “pure heart” as indicators of the purity foundation.

List 1.

Replaceable Symbols and Punctuations

1. ,
2. !
3. ?
4. (
5. :
6. ;
7. “
8. --
9. *
10. (space)-
11. -(space)
12. /
13. ~
14. &
15. +
16. _

Table E2

Top 10 popular movies with the highest moral salience of each foundation

Square Root Function									
Care	Year	Fair	Year	Loyalty	Year	Authority	Year	Purity	Year
Lionel Lincoln: The Professional	1994	The Wolf of Wall Street	2013	Saving Private Ryan	1998	V for Vendetta	2005	The Wolf of Wall Street	2013
Saving Private Ryan	1998	American History X	1998	Braveheart	1995	The Godfather	1972	Se7en	1995
Schindler's List	1993	The Usual Suspects	1995	The Godfather: Part II	1974	Gladiator	2000	Pulp Fiction	1994
Kill Bill: Vol. 1	2003	Django Unchained	2012	The Godfather	1972	Braveheart	1995	American Beauty	1999
The Silence of the Lambs	1991	Braveheart	1995	Inglourious Basterds	2009	The Godfather: Part II	1974	V for Vendetta	2005
Inglourious Basterds	2009	V for Vendetta	2005	V for Vendetta	2005	Star Wars: Episode VI - Return of the Jedi	1983	The Departed	2006
Django Unchained	2012	Inglourious Basterds	2009	Star Wars: Episode V - The Empire Strikes Back	1980	Star Wars: Episode IV - A New Hope	1977	Braveheart	1995
Se7en	1995	Kill Bill: Vol. 1	2003	Iron Man	2008	The Departed	2006	Django Unchained	2012
V for Vendetta	2005	The Prestige	2006	Gladiator	2000	Goodfellas	1990	Kill Bill: Vol. 1	2003
The Green Mile	1999	The Departed	2006	The Lord of the Rings: The Two Towers	2002	Star Wars: Episode V - The Empire Strikes Back	1980	The Lord of the Rings: The Return of the King	2003

Table E3

Top 10 popular movies with the highest moral salience of each foundation

Truncate Function									
Care	Year	Fair	Year	Loyalty	Year	Authority	Year	Title	Year
Lion: The Professional	1994	The Wolf of Wall Street	2013	Braveheart	1995	V for Vendetta	2005	The Wolf of Wall Street	2013
Schindler's List	1993	The Usual Suspects	1995	The Godfather: Part II	1974	The Godfather	1972	Seven	1995
Saving Private Ryan	1998	American History X	1998	Saving Private Ryan	1998	Gladiator	2000	Pulp Fiction	1994
V for Vendetta	2005	Django Unchained	2012	The Lord of the Rings: The Two Towers	2002	Braveheart	1995	American Beauty	1999
The Green Mile	1999	Braveheart	1995	V for Vendetta	2005	Goodfellas	1990	V for Vendetta	2005
Inglourious Basterds	2009	The Prestige	2006	Star Wars: Episode V - The Empire Strikes Back	1980	The Godfather: Part II	1974	Braveheart	1995
Kill Bill: Vol. 1	2003	V for Vendetta	2005	Iron Man	2008	Star Wars: Episode IV - A New Hope	1977	Django Unchained	2012
Django Unchained	2012	Inglourious Basterds	2009	Inglourious Basterds	2009	The Departed	2006	The Lord of the Rings: The Return of the King	2003
The Silence of the Lambs	1991	Memento	2000	Avatar	2009	Saving Private Ryan	1998	The Departed	2006
The Dark Knight	2008	The Wolf of Wall Street	1994	The Lord of the Rings: The Return of the King	2003	Star Wars: Episode VI - Return of the Jedi	1983	Goodfellas	1990

Table E4. Retesting the hypotheses without manual editing of the dictionary and phrases.

Square Root					Truncate				
D.V.	Film Ratings	R-squared:	0.27		D.V.	Ratings	R-squared:	0.27	
Model:	OLS	Adj. R-squared:	0.27		Model:	OLS	Adj. R-squared:	0.27	
Method:	Least Squares	F-statistic:	122.6		Method:	Least Squares	F-statistic:	127.80	
	coef	std err	t	P> t		coef	std err	t	P> t
const	6.95	0.32	21.68	0.00	const	7.07	0.32	21.96	0.00
care	0.32	0.04	8.37	0.00	care	46.88	7.49	6.26	0.00
fair	0.34	0.08	4.35	0.00	fair	35.38	14.23	2.49	0.01
loyalty	0.83	0.09	9.24	0.00	loyalty	176.63	20.00	8.83	0.00
authority	0.97	0.08	12.77	0.00	authority	141.84	13.98	10.15	0.00
purity	-0.71	0.04	-17.64	0.00	purity	-154.47	7.94	-19.46	0.00
action	-0.22	0.03	-8.68	0.00	action	-0.21	0.03	-8.14	0.00
comedy	0.00	0.02	-0.19	0.85	comedy	-0.01	0.02	-0.40	0.69
drama	0.48	0.02	23.71	0.00	drama	0.53	0.02	26.04	0.00
budget	0.03	0.02	2.02	0.04	budget	0.03	0.02	2.03	0.04
year				YES	year				YES
D.V.	No. of raters	R-squared:	0.31		D.V.	No. of raters	R-squared:	0.36	
Model:	OLS	Adj. R-squared:	0.31		Model:	OLS	Adj. R-squared:	0.36	
Method:	Least Squares	F-statistic:	154.00		Method:	Least Squares	F-statistic:	216.10	
	coef	std err	t	P> t		coef	std err	t	P> t
const	3.11	0.39	8.07	0.00	const	3.45	0.36	9.50	0.00
care	0.88	0.04	20.31	0.00	care	167.83	7.82	21.47	0.00
fair	1.47	0.09	16.81	0.00	fair	206.68	14.86	13.91	0.00
loyalty	0.31	0.10	3.11	0.00	loyalty	146.06	20.87	7.00	0.00
authority	1.07	0.09	12.64	0.00	authority	80.18	14.59	5.49	0.00
purity	0.63	0.05	14.13	0.00	purity	72.58	8.29	8.76	0.00
action	-0.14	0.03	-5.05	0.00	action	-0.11	0.03	-4.08	0.00
comedy	0.23	0.02	9.82	0.00	comedy	0.25	0.02	11.39	0.00
drama	-0.31	0.02	-13.56	0.00	drama	-0.29	0.02	-13.64	0.00
budget	0.33	0.02	19.41	0.00	budget	0.31	0.02	19.44	0.00
year				YES	year				YES
D.V.	Box office	R-squared:	0.26		D.V.	Box office	R-squared:	0.27	
Model:	OLS	Adj. R-squared:	0.25		Model:	OLS	Adj. R-squared:	0.27	
Method:	Least Squares	F-statistic:	62.65		Method:	Least Squares	F-statistic:	67.67	

	coef	std err	t	P> t		coef	std err	t	P> t
const	4.30	0.65	6.63	0.00	const	4.51	0.64	7.07	0.00
care	0.78	0.13	6.07	0.00	care	153.58	23.71	6.48	0.00
fair	1.71	0.25	6.91	0.00	fair	298.95	43.84	6.82	0.00
loyalty	1.73	0.30	5.71	0.00	loyalty	283.84	63.75	4.45	0.00
authority	1.55	0.26	6.05	0.00	authority	189.25	45.39	4.17	0.00
purity	0.02	0.13	0.14	0.89	purity	-21.17	24.49	-0.86	0.39
budget	0.61	0.04	15.81	0.00	budget	0.59	0.04	15.59	0.00
action	-0.06	0.08	-0.73	0.47	action	-0.05	0.08	-0.69	0.49
comedy	0.38	0.07	5.69	0.00	comedy	0.45	0.07	6.79	0.00
drama	-0.76	0.06	-11.99	0.00	drama	-0.73	0.06	-11.72	0.00
year				YES	year				YES

Explanations of TF-IDF

While TF-IDF is a more established method, we decided that its traditional form will not achieve the desired word weighting we aim for. This is because TF-IDF weighs term frequency by multiplying the term frequency with the inverse document frequency, as shown in the equation below.

The traditional form of TF-IDF:

$$\text{TF-IDF}(t, d) = \text{TF weight} * \text{IDF weight} = \text{TF}(t, d) * \log(N/(\text{DF} + 1))$$

IDF (t) indicates the frequency of a word appearing across different documents. For example, if a word appears in nearly every document (e.g., Stopwords), it is assigned a lower weight. However, in this research, we combined all reviews of one film into one document, which means one document represents one film's merged reviews. If we use the traditional TF-IDF to weight words, it would result in that a moral word that appears more rarely in the merged reviews *across different films* would be given more weight when calculating moral salience. This does not make sense in this research.

That said, the square root function can be treated as an updated variant of TF-IDF that fits better with our goal. As we are aware, there are several variations of TF-IDF (see the summary table at <https://en.wikipedia.org/wiki/Tf%E2%80%93idf>). One such variation treats IDF as 1 (unary; so we can avoid the problem of rare words across reviews of different films would be weighted more), and the TF is term frequency. The square root function is similar to this variation, and the only difference is we squared root TF to down weight the over-frequent words in the documents which aligns with the objective of this research.