

Coding Manual For Public Engagement with Science

Each unit must be assigned exactly one code a Frame code or one of the two Uncoded codes.

For Tweets, the unit of coding is a single tweet.

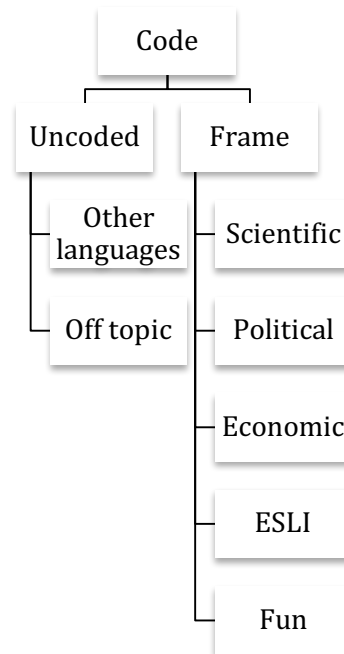


Figure: Code Taxonomy

Label	<ul style="list-style-type: none"> • Definition: formal definition of the code from Schäfer: From Public Understanding to Public Engagement : An Empirical Assessment of Changes in Science Coverage, Mike S. Schäfer, Science Communication 2009 30: 475 • Notes: how to decide whether to apply the code for Twitter PES. The original definitions are for high end German newspapers so modification is needed for the Twitter context. • Example: typical example/s of the correct use of the code. • Negative example - optional
Off Topic	<ul style="list-style-type: none"> • Definition: <i>Uncoded</i> is for any unit of analysis, which is not assigned any of the other codes. • Notes: First try to apply all the other codes. If none is applicable code the unit as Uncoded. Typically the unit will be off topic if not about the scientific topic in question or contains insufficient evidence to code it. References to recreational drugs come under this heading unless discussing manufacture – for making methylamine one of Fun or Scientific is needed.

	<ul style="list-style-type: none"> • Example: “<i>Damn, is this basement ever warm or is it stuck in permafrost?!</i>” (NOTE of permafrost as very cold (also for fridity)). “ #Curiosity http://t.co/6a68X8Gv” (Note too little information) “<i>The light of friendship is like the light of phosphorus even plainest when all around is dark.</i>” - Grace Crowell 1877 “#SuperBowlSunday #MEDICATED #Hiigh #Permafrost y #HASH”
Other Languages	<ul style="list-style-type: none"> • Definition: Other languages is for any unit of analysis which is not written in English. • Notes: Defined as a separate class because it may be an indicator of international interest. For safety, apply even if the unit appears to be on topic because the subtleties of framing etc. in other languages will be easy to miss. If there is a mix of languages and there is enough in English to understand use a different code • Example: “RT @mariozelayach: A las 11:30 pm hora de El Salvador el robot #Curiosity descienda en #Marte @teledos_tcs” • Negative example <i>Buen cumplea_os me espera :) RT @aberron "Initial images from MARDI are expected to be released Aug. 6 the day after landing." #curiosity</i> (NOTE code as Scientific)
Scientific	<ul style="list-style-type: none"> • Definition: “The <i>scientific frame</i> includes descriptions of scientific “facts,” evaluations of the scientific and medical implications of the research, and discussions about basic scientific norms and rights, such as freedom of research and research funding.” • Notes: Apply this code if the writer is mainly interested in the scientific content of the subject. Reporting findings, stating facts, timing of events. The tweet may contain a link to a report of facts, a scientific picture (e.g. photo of Mars). Sharing of precise nutrition information, which appears to be the result of scientific study, should be coded here and imprecise nutrition information under ELSI. Scientific uncertainty and reliability of results may be coded scientific unless it appears to be political attempts to discredit inconvenient results. Measurement of environmental risk would be scientific. Technical terminology often flags scientific frame. • Example: “<i>New model suggests 1 to 2 thirds of Earth's permafrost will thaw by 2200, sending more carbon into the atmosphere.</i>” “<i>50% of Canada is permafrost</i>” “<i>A bottle of beer can contain 92mg of potassium 14mg of calcium and 48mg of phosphorus all minerals that are essential</i>” (NOTE because of the precision) “<i>methylamine of course but I was thinking a Red Phosphorus cook. It s</i>”

	<p><i>probably the most efficient.</i>” (Note because it discusses the chemical synthesis)</p> <p>“2012 was deepest permafrost thaw of past 30 yrs in NW Canda; #HYDRA 13C pulse on shrubs now ‘greening’”(NOTE the technical terminology)</p>
Political	<p><input type="checkbox"/> Definition: “The <i>political frame</i> refers to debates about the external (political and/or judicial) regulation of science. This frame also includes assessments of public participation in such regulation.”</p> <ul style="list-style-type: none"> • Notes: Apply this code if the writer is mainly interested in political matters related to the subject, e.g. action which needs to be taken at government level, political campaigning, obvious political or national alignment of writer, science as a cause of national pride or shame. Also use for politics of spending. Because “everything is political” if there is a close decision between Political and one of ELSI or Economic, then priority should be given to ELSI and Economic. Policy for addressing environmental risk is covered by this frame. <p><input type="checkbox"/> Example: “<i>Permafrost Melt Soon Irreversible Without Major Fossil Fuel Cuts</i>”</p> <p>“<i>Pravda explains global warming: tool of West. Does this mean permafrost wouldn't melt in Putin's mouth?</i>”</p> <p>“<i>Pentagon Reverses Position and Admits U.S. Troops Used White Phosphorus Against Iraqis in Fallujah</i>” (Note, mentions a political organization)</p> <p>“<i>The Big Melt: methane release from permafrost due to ice-free Arctic Ocean is the reason to prep now.</i>” (Note call for policy change without emotive element that would make it ELSI)</p> <p>“<i>Less Arctic ice=\$100 billion in revenue. Melting permafrost=\$60 trillion in loss. Not worth it! #AGW</i>” (Note political position on cost benefit which might otherwise be Economic)</p>
Economic	<p><input type="checkbox"/> Definition: “The <i>economic frame</i> consists of both microeconomic aspects, such as the research’s impact on companies and businesses, as well as macroeconomic aspects, such as impacts on stock markets or national economies.”</p> <ul style="list-style-type: none"> • Notes: Apply this code if the writer is mainly interested in economic issues related to the subject, for instance, its implications for business, its costs, advertisements for products directly related to the topic (e.g. supplements, fertilizers, homeopathic phosphorus). DO not apply if the argument seems to the ethics or politics of spending, or for advertisements for products that just use the topic word. <p><input type="checkbox"/> Examples: “<i>When warm weather returns, the permafrost starts melting again and more methane leaks into the atmosphere, how much money needed to correct?</i>”</p> <p>“<i>PetAg Calcium Phosphorus Growth Tablets 20-Ounce: http://t.co/olcYJAYb</i>”</p> <p>“<i>How can we use #phosphorus more efficiently and create opportunities for</i></p>

	<p><i>#recycling?”</i></p> <p>□ Negative examples “ <i>Better high... MT @genejm29 RT @JonahLupton: It cost as much to land #Curiosity on Mars as the world spends on illegal drugs every 48 hours.</i>” (Note should be political)</p> <p><i>“Greenovations: Powertron Global PermaFrost http://t.co/034czIX2 via @Green_Register”</i> (Note should be Off Topic – its some kind of engine cleaner)</p> <p><i>“Less Arctic ice=\$100 billion in revenue. Melting permafrost=\$60 trillion in loss. Not worth it! #AGW”</i> (Note – political)</p>
<p>ELSI (Ethical Legal and Social)</p>	<p>□ Definition: “<i>The ethical, legal, and social (hereafter referred to as “ELSI”) frame includes discussions about science’s view of human nature, possible discrimination based on the respective research, and property and patenting issues.</i>”</p> <p>• Notes: Apply this code if 1) Ethical the writer is mainly interested in ethical issues, e.g. were the experiments conducted ethically, does the subject create ethical dilemmas in medical decisions, the post mentions religion or issues of belief, ethical tone of statements, e.g. criticizing inaction on important issues 2) legal issues, e.g. may laws need to be changed because of the subject, laws have been broken, legal compliance e.g. on pollution and 3) social issues, e.g. implications for individuals or wider society, social situations (e.g. parties, press conferences), social exchange (e.g. sharing lightweight nutrition info).</p> <p>□ Example: “<i>Challenge, sustain one's energy w/out hastening permafrost melt.</i>”</p> <p><i>” Everyone watches Australia burn and the permafrost melt, but won't do anything about it!”</i></p> <p><i>“@GreenConduct: Video: Unlocking Methane in the Permafrost is a Global Warming Time Bomb http://t.co/LCZgsRRNCP”</i> (NOTE the phrase Time bomb is emotive so implies an ethical frame relating to inaction)</p> <p><i>“Just some perspective for those who think #Manning a traitor. Who ordered the use of white phosphorus on Fallujah? Another crime unpunished.”</i></p> <p><i>“RT @NOAAOceanToday: Alaskan Arctic villages hit hard by climate change - melting permafrost soil erosion more intense storms. http://t ...”</i></p> <p><i>“RT @BoRyanMaynard: I m highly impressed with how many people are paying attention to the #MarsLanding right now. #Curiosity @MarsCuriosity”</i></p> <p><i>“Half a DRAGONFRUIT for desert tonight! Packed with numerous nutrients including Vitamin C phosphorus calcium ..”</i></p> <p><i>“Steinbach Meets New Phosphorus Limits - Lake Winnipeg & Red River”</i> (NOTE legal compliance)</p>

Fun	<ul style="list-style-type: none"> • Definition: The <i>Fun</i> frame refers to amusement, jokes and entertainment. • Notes: Apply this code for generic good wishes, if the author is taking the subject light heartedly, making a joke about it, or making a pun or witticism using terms derived from it, or it contains references to entertainment or toys. May contain positive emoticons or jokey abbreviations, e.g. lol. Or slang e.g. “martian language is the new shit”. However the unit of analysis must use the term in its correct sense metaphoric usages should be off topic. • Example: “<i>RT @HAL9000_: RT @MarsCuriosity . @NASA ok guys enough with the jokes how am I really going to land? #Curiosity</i>” <p style="margin-left: 40px;"><i>“RT @jaysonstreet: My son just said the shadow picture reminds him of Wall-E lol :-) #ProudGeekDad #Curiosity”</i></p> <p style="margin-left: 40px;"><i>“What did the bartender say when Oxygen Hydrogen Sulfur Sodium and Phosphorus walked into the bar? OH SNaP!”</i></p> <p style="margin-left: 40px;"><i>“Unreasonably excited that my name will be landing on Mars on Monday #curiosity”</i></p> <p style="margin-left: 40px;"><i>“RT @HAL9000_: RT @MarsCuriosity . @NASA ok guys enough with the jokes how am I really going to land? #Curiosity”</i></p> <p style="margin-left: 40px;"><i>“hahaha xD Learning how to cook meth...One episode at a time. Remember red phosphorus+moisture+accelerated by heat=BAD”</i> (NOTE this refers to the plot of the soap opera Breaking Bad, hahaha also suggest the writer finds it amusing)</p> <p style="margin-left: 40px;"><i>“Trying to time my Whoopie Cushion App premier to coincide with a 50-gigaton release of methane from thawing Siberian permafrost.”</i></p>
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