HIGHER-ORDER CONTRONYMS

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"If I had a world of my own, everything would be nonsense. Nothing would be what it is because everything would be what it isn't. And contrariwise, what it is, it wouldn't be, and what it wouldn't be, it would. You see?"

—Alice in Wonderland (1951)

A contronym or autonym is a polysemous word where one of the meanings is the antonym of another—that is, a word which is its own opposite [10]. Celebrated examples include cleave (which can mean either "to separate" or "to adhere"), left ("remaining" or "departed"), and fast ("immobile" or "moving rapidly"); more comprehensive lists abound in past Word Ways articles (e.g., [7, 8]) and on the Internet. In 1967, Dmitri Borgmann proposed turning arbitrary words into their opposites via chains of synonyms [1], a game which he and many others since have indulged in [2, 3, 9]. Though Borgmann referred to such constructions as synonym chains, I think it more fitting to call them higher-order contronyms, since they are really just a generalization of this much older phenomenon, and since there is nothing about the term "synonym chain" which implies that the ends must be opposites.

We can formalize the idea of contronymy by saying that a word \( w_1 \) is a contronym of order \( n \) if there exists some shortest sequence of distinct words \( w_1 \leftrightarrow w_2 \leftrightarrow \cdots \leftrightarrow w_n \) such that \( w_1 \) is an antonym of \( w_n \), and every pair of adjacent words \( w_i, w_{i+1} \) are synonyms. In a 1988 article, A. Ross Eckler claimed that such sequences are not necessarily bidirectional, since a dictionary or thesaurus’s entry for \( w_i \) may list \( w_{i+1} \) as its synonym, but not vice versa [3]. However, I would argue that such omissions cannot be taken as evidence of nonexistence of the reverse relation; rather, they are almost certainly the result of editorial discretion and space concerns. The symmetric character of synonymy and antonymy is not only common sense, but also commonly accepted by academic linguists [4]. It follows, then, that \( w_n \) must also be a contronym of order \( n \).

With this definition in mind, the aforementioned cleave, left, and fast, are all trivially contronyms of order 1. For an example of a higher-order contronym, consider the sequence depart \( \leftrightarrow \) quit \( \leftrightarrow \) stop \( \leftrightarrow \) stay. Observe that depart and quit are synonyms (in the sense of leaving somewhere), as are quit and stop (in the sense of ceasing an activity), as are stop and stay (in the sense of immobilizing something). But depart and stay are antonyms (in the senses of leaving or remaining somewhere), so they are both contronyms of order 4.

To find higher-order contronyms all that is required is a dictionary or thesaurus which lists synonyms and antonyms, plus the patience to follow the synonymic paths. The process can be made a bit less onerous through the use of a machine-readable lexicon and a little programming to automate the search. This is, in fact, exactly what Eckler proposed over a quarter of a century ago: he envisaged a “network of synonyms, with thousands of entries” from which contronyms could be mined computationally [3]. In 1988, however, electronic dictionaries were rare and expensive, and it would have been difficult to extract their synonymic and antonymic relations into an easily searchable semantic network. Nowadays comprehensive semantic networks for several languages
are freely available online. The most popular of these is WordNet [5], an electronic database which provides definitions, synonyms, antonyms, and other information for 147,306 English words. To realize Eckler’s vision, I performed a contronym search on WordNet, and the results show higher-order contronyms to be surprisingly common: I discovered 18 contronyms of order 2, 36 of order 3, 93 of order 4, 192 of order 5, 193 of order 6, and 208 of order 7. So 0.5% of all words in WordNet are contronyms of order 7 or less.

There are a couple of things to note about my results. First, my chains seem short in comparison with some previously reported results—Eckler, for example, gives a chain of 21 synonyms [3]. However, this is due to the less rigorous rules which had heretofore been used for calculating chain lengths. Even when duplicate words are prohibited, it is easy to construct extremely long chains simply by including every possible yet-unused synonym for a given concept. Recall that my definition of a contronym requires the synonyms to constitute the shortest such chain. This rule is analogous to the “minimum steps” rule used for calculating word ladders [6]; under it, any redundant sequences from the chain must be pruned before calculating its order. Consequently, every pair of adjacent words in the chain must refer to a concept which is distinct from all the other concepts referred to in the chain.

Second, many of the contronyms discovered by my search rest on synonym chains with very obscure or specialized word senses. For example, it reports birth as an order-5 contronym based on the sequence birth ↔ bear ↔ endure ↔ last ↔ death. I expect that any casual reader would agree with all the synonym relations in this chain except for the final one. According to WordNet, last and death are synonyms in expressions such as “a struggle to the last”; though technically correct this usage is so particular that it’s not something I’ve seen recorded in any other dictionary or thesaurus.

Below is a selection of interesting higher-order contronyms, including the synonym chains, where I think most people could easily verify the synonymy between adjacent words without recourse to a dictionary or thesaurus. A complete list of the contronyms found by my search will be made available on my web page.

**Contronyms of order 2**
- colour ↔ discolour

**Contronyms of order 3**
- continue ↔ stay ↔ stop
- fail ↔ die ↔ pass
- give ↔ yield ↔ take

**Contronyms of order 4**
- head ↔ lead ↔ trail ↔ tail
- shrink ↔ reduce ↔ dilute ↔ stretch
- soften ↔ moderate ↔ temper ↔ harden

**Contronyms of order 5**
- source ↔ root ↔ settle ↔ sink
- start ↔ depart ↔ quit ↔ stop
- supply ↔ issue ↔ take ↔ demand

- accept ↔ bear ↔ stand ↔ resist ↔ refuse
- agree ↔ hold ↔ withstand ↔ resist ↔ dissent
- associate ↔ assort ↔ separate ↔ disunite ↔ dissociate
- blur ↔ smudge ↔ spot ↔ point ↔ sharpen
- bore ↔ gauge ↔ gage ↔ stake ↔
interest
- bottom ↔ rear ↔ back ↔ cover ↔ top
- dark ↔ obscure ↔ vague ↔ faint ↔ light
- enlist ↔ engage ↔ operate ↔ run ↔ discharge
- extinguish ↔ eliminate ↔ pass ↔ clear ↔ light
- heavy ↔ dense ↔ dim ↔ faint ↔ light
- independent ↔ main ↔ master ↔ subdue ↔ subordinate
- joint ↔ articulate ↔ say ↔ tell ↔ separate
- primary ↔ basal ↔ base ↔ lowly ↔ secondary
- progress ↔ go on ↔ pass ↔ lapse ↔ regress
- sharp ↔ keen ↔ neat ↔ straight ↔ flat
- shut ↔ exclude ↔ turn out ↔ spread out ↔ open
- sit ↔ seat ↔ fundament ↔ base ↔ stand
- succumb ↔ yield ↔ bear ↔ endure ↔ survive
- surrender ↔ fall ↔ decline ↔ refuse ↔ resist
- thick ↔ compact ↔ contract ↔ reduce ↔ thin
- unite ↔ join ↔ fall in ↔ break ↔ separate
- wicked ↔ severe ↔ stark ↔ pure ↔ virtuous
- dishonour ↔ violate ↔ plunder ↔ prize ↔ award ↔ honour
- ending ↔ termination ↔ result ↔ solution ↔ root ↔ beginning
- entangle ↔ tangle ↔ ravel ↔ unravel ↔ untangle ↔ disentangle
- forbid ↔ prevent ↔ keep ↔ support ↔ tolerate ↔ allow
- foot ↔ base ↔ basal ↔ primary ↔ principal ↔ head
- forward ↔ fore ↔ bow ↔ bend ↔ turn ↔ reverse
- full ↔ broad ↔ liberal ↔ free ↔ discharge ↔ empty
- hard ↔ heavy ↔ dense ↔ dim ↔ subdued ↔ soft
- ignite ↔ light ↔ clear ↔ pass ↔ eliminate ↔ extinguish
- stable ↔ static ↔ still ↔ smooth ↔ fluid ↔ unstable
- tight ↔ close ↔ snug ↔ cozy ↔ informal ↔ loose
- vomit ↔ retch ↔ gag ↔ strangle ↔ repress ↔ keep down
- weak ↔ feeble ↔ lame ↔ square ↔ solid ↔ strong

Contronyms of order 7
- agreement ↔ correspondence ↔ balance ↔ remainder ↔ difference ↔ divergence ↔ disagreement
- balance ↔ counterbalance ↔ counteract ↔ subvert ↔ overthrow ↔ derangement ↔ unbalance
- busy ↔ occupy ↔ reside ↔ rest ↔ perch ↔ light ↔ idle
- cold ↔ frigid ↔ frosty ↔ snappy ↔ lively ↔ live ↔ hot
- conservative ↔ cautious ↔ timid ↔ faint ↔ light ↔ loose ↔ liberal
- distrust ↔ suspect ↔ surmise ↔ guess ↔ think ↔ believe ↔ trust
- false ↔ fake ↔ cook ↔ fix ↔ secure ↔

Contronyms of order 6
- acute ↔ keen ↔ great ↔ heavy ↔ dense ↔ obtuse
- closing ↔ end ↔ stop ↔ break ↔ gap ↔ opening
- decrease ↔ fall ↔ descend ↔ derive ↔ gain ↔ increase
- deteriorate ↔ devolve ↔ return ↔ recall ↔ retrieve ↔ recover
- differentiate ↔ mark ↔ check ↔ contain ↔ incorporate ↔ integrate
dependable ↔ true
• foreground ↔ spotlight ↔ spot ↔ place
  ↔ range ↔ scope ↔ background
• green ↔ immature ↔ young ↔ new ↔
  modern ↔ advanced ↔ ripe
• immature ↔ young ↔ new ↔ modern ↔
  advanced ↔ ripe ↔ mature
• inclination ↔ tilt ↔ sway ↔ swing ↔
  vacillation ↔ hesitation ↔ disinclination
• inconvenience ↔ put out ↔ douse ↔
  duck ↔ dodge ↔ contrivance ↔
  convenience
• insane ↔ mad ↔ sore ↔ sensitive ↔
  sensible ↔ reasonable ↔ sane
• multiply ↔ breed ↔ strain ↔ sieve ↔
  sort ↔ separate ↔ divide
• pain ↔ hurt ↔ offend ↔ violate ↔
  ravish ↔ delight ↔ pleasure
• short ↔ little ↔ slight ↔ flimsy ↔
  unconvincing ↔ improbable ↔ tall
• unfurl ↔ unroll ↔ unwind ↔
  disentangle ↔ straighten out ↔ clear up
  ↔ wrap up
• victory ↔ triumph ↔ prevail ↔
  dominate ↔ master ↔ overcome ↔
  defeat

References