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The Tom Swift illusion*

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1. Introduction

Readers of prose from different authors or different genres can acquire sensitivity to *prose style*, used here to mean linguistic cues that distinguish the sources from each other. Little is known about the acquisition process or the end product. In a rare empirical study of memory for prose style, Brewer and Hay (1984) have suggested that the cues are primarily lexical, syntactic, and idiomatic, rather than semantic. The proposed independence of form from content can account for why the same message can be expressed in different styles, as when the Gettysburg Address is rewritten in the style of Dwight Eisenhower (unsigned article, "I Do Want to Say This", *The New Republic*, June 17, 1957, p. 7). Form-content independence has also been used as a theoretical basis for algorithmic text-style transfer (Jin et al. 2022).

On the other hand, studies of memory for prose itself have consistently found that its lexical and syntactic aspects are forgotten much faster than the semantic gist, often within seconds of presentation (Gurevich et al. 2010, Hamrick 2014, Kuhbandner 2020, Sacripante et al. 2023, and references cited therein). If the mental representation of a prose style is abstracted from memory traces left by the underlying prose, we would expect it to be dominated by semantic cues rather than lexical or syntactic ones.

This paper describes a historical event in which a conflict between semantic and syntactic-lexical style cues was resolved in favor of the semantic cues: the Tom Swifty fad of 1963. Tom Swifties are a joke schema popularized in the United States in a book of that title (Pease et al. 1963). The book's introduction, quoted in Example (1), derives them from a series of 40 books of fiction aimed at children, chiefly boys, that appeared between 1910 and 1941 under the pen name of Victor Appleton. They were written by Edward Stratemeyer

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and a team of ghostwriters. Though popular in their day, the books are now remembered almost exclusively as the namesake of the game.

(1) If your childhood commenced after the era of Jules Verne but before the Oz books, chances are you hold fond memories of Tom Swift. Remember *Tom Swift and His Aerial Warship*?

TOM SWIFTIES owe their existence to a stylistic mannerism of Tom Swift's author. He rarely had Tom say anything without noting the manner of his deathless utterance adverbially.

The idea of TOM SWIFTIES is to create a link between what's said and how it's said. E.g., "I'll take the prisoner downstairs," said Tom *condescendingly*.

WARNING: Tom Swifting is highly catching. "So prepare to get hooked," said Tom *angularly*. "Now hurry up, there's fun ahead," said Tom *Swiftily*. (Pease et al. 1963:unpaged)

Appleton's penchant for the *said Xly* construction has been affirmed ever since, often in terms that imply first-hand knowledge of the Tom Swift books in the affirmant or the audience, and apparently without contradiction from any quarter. It is nonetheless false: Adverbial modification of *said* or of other quotatives is not especially frequent in the Tom Swift books compared to other popular literature of the same era. Their actual quirk is avoidance of *said* in favor of other quotative verbs. Readers' experience with expressions like *Tom exclaimed* seems to have been generalized along semantic lines rather than lexical or syntactic ones, so that readers accepted semantic paraphrases like *Tom said excitedly* as characteristic of the Tom Swift style even though they were syntactically and lexically unlike it.

The remainder of this paper is organized as follows. Section 2 reviews fad-era journalists' characterizations and imitations of the Tom Swift style, which agree with those of Pease et al. (1963). Section 3 reviews the acceptance of these characterizations and imitations by the fad-era public and later scholarship. The next three sections show that, compared to a sample of other popular literature of the day, adverbial modification of *said* (Section 4) and of other quotative verbs (Section 5) is not especially frequent in the Tom Swift books, but that they do have an extremely high rate of non-*said* quotatives (Section 6). Section 7 discusses some possible explanations for the discrepancies.

2. Testimony of the primary witnesses

Tom Swifties was registered for U.S. copyright on March 14th (Library of Congress Copyright Office 1963). Within a few weeks, a nationwide fad was raging, as shown by the Google Books *n*-gram counts for `Tom Swifties` in Figure 1.

In the periodicals that make up most of the 1963 peak in Figure 1, writer after writer asserts that the *said Xly* construction was conspicuously frequent, indeed nearly obligatory, in the Tom Swift books, especially when Tom himself was speaking. Many explicitly appeal to either the reader's memory or their own. The pattern was set even before the book

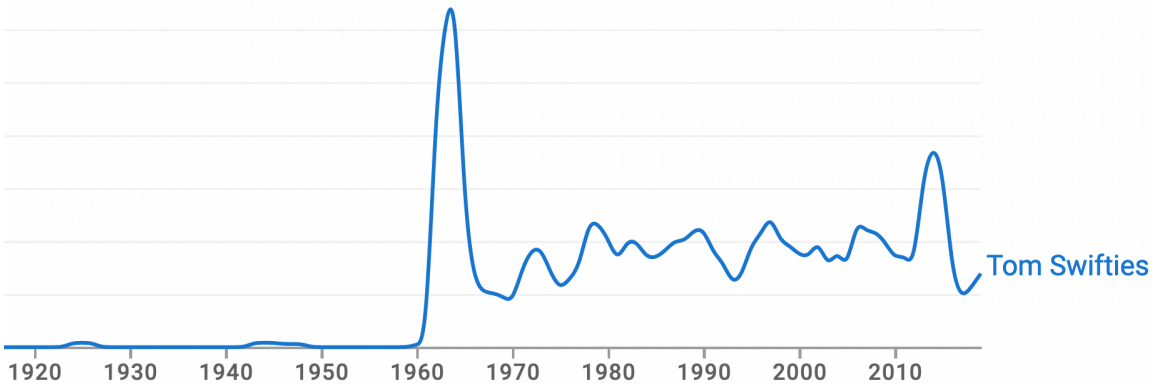

Figure 1: Google Books *n*-gram frequency for `Tom Swifties`, 2019 American English corpus, 1-year smoothing. The peak frequency is 6.2×10^{-7}.

appeared, in an anonymous item in the men's lifestyle magazine *Playboy* that was written with input from Pease and McDonough:[1].

(2) Perhaps the most unforgettable of all the memories inspired by this fabled folk hero is the prose of Victor Appleton, Tom's inimitable creator: a mélange of wildly improbable plots larded with impossibly stilted dialog beside which the pomposities of *Bullwinkle*'s incorruptible Dudley Doright fairly crackle with wit and verisimilitude. … And as if this weren't enough, [Tom] would always say it "steadfastly," "cheerfully," "jauntily," or even "gaily."

As we slogged "resolutely" through the syntactical swamp of a typically Tom Swiftian tale the other day, we found ourself thrashing about in search of fresh and more fitting dialog for the unlikely adverbs attached like barnacles to nearly every deathless utterance. (Unsigned article, "Playboy After Hours", *Playboy*, Vol. 10, No. 2, February 1963, p. 19.)

These claims are repeated in many of the leading news sources of the time. In this section are collected what will be called the "primary witnesses": all cases that I was able to find in which an explicit claim was made about the style of the Tom Swift books, and which were published in the U.S. in 1963 in either a big-city newspaper, a magazine with national circulation, a syndicated wire service, or a trade publication for writers, editors, or publishers.[2] Where possible, each author's birth year was ascertained by searching obituaries or on-line reference works such as Wikipedia. Illustrative examples are shown in (3)–(5):

[1] *Playboy* bought 20 Swifties from the book (Dick West, "Tom Swifties Again", United Press International, *The Hanford (California) Sentinel*, June 12, 1963), and also reused some language from its introduction.

[2] The main search portals were ProQuest, including ProQuest Central and ProQuest Historic Newspapers; the Internet Archive; and Google Books.

(3) [W]hat lingered in his readers' tiny minds even longer than his exploits was the precision with which Author Victor Appleton recorded his exact tone of voice and every mood. Tom Swift never simply "said" anything; he said it "soberly", "thoughtfully", "excitedly" (one classic rejoinder: " 'Yes, it is an emergency all right,' returned Tom slowly"). (Unsigned article, "Season for Swifties", *Time*, May 31, 1963, p. 38.)

(4) Those who remember Tom Swift (and His Aerial Warship) will recall that his biographer sedulously jotted down not only everything Tom said but how he said it. Tom never did just say something. He either kept his mouth shut or he said it "wittily" or "flatly" or "cheerily" or something like that. (Unsigned article, "Tomfoolery", *Sports Illustrated*, May 6, 1963, p. 13)

(5) If you recall those books, you may remember that Tom and his companions spoke in adverbs. Virtually everything they said was said adverbially. A typical bit of dialogue might go something like this:

"Don't worry, chaps, I'll find a way out," Tom said calmly.

"We're with you, Tom," the others said trustingly. (Unsigned article, "Tom Swifties Are Exchanged, Columnist Says", United Press International, cited from *Colorado Springs Gazette Telegraph*, May 23, 1963).

Some witnesses provided verifiably authentic quotations from the Tom Swift books. *Life*'s Scot Leavitt (b. 1924) quotes *Tom Swift and His Air Scout*:

(6) It appears all through *Tom Swift and His Air Scout, Tom Swift and His Electric Runabout, Tom Swift and His Electric Rifle, Tom Swift and His Great Searchlight*, or any other of the 40 books in this series. The expressions go like this:

"Come on!" cried Tom impulsively, or *"I wish I'd known of it at the time," said Tom savagely*. For anyone who absorbed the Tom Swift series during his verbally formative years — as I did — [Appleton's] way with adverbs was a guarantee of authentic Appleton. It was not a graceful style, but it was distinctive enough to become etched permanently on the subconscious of hundreds of thousands of youths, myself included. (Scot Leavitt, "I've Come Back, Cried Tom Swiftly", *Life*, May 31, 1963, p. 19.)

Jerry Doolittle (b. 1933) of the *Washington Post* quotes *Tom Swift in the Land of Wonders*:

(7) Tom Swifties grew out of Stratemeyer's love for the vivid adverb, as in, " 'Oh, we'll dispose of him all right,' asserted Tom boldly." . . . Stratemeyer himself was too busy writing books to turn out this variety of Tom Swifty [i.e., the deliberately humorous variety — EM]. His tended to be more prosy, like " 'All aboard! Step lively now! This boat makes no stops this side of Boston,' cried Ned Newton gaily." . . .

Tom and his companions are punting footlessly up a South American river when a professor in the party idly touches what he foolishly takes to be a floating log. It is not.

" 'Alligator,' explained Jacinto succinctly.

" 'And always hungry,' observed Jacinto, grimly. " (Jerry Doolittle, "Crazy Pun Craze Sweeps City", *The Washington Post*, May 19, 1962, p. E2.)

Newsweek misquotes one of the same sentences from *Tom Swift in the Land of Wonders*, changing the verb to *said*:

(8) The object of the game is to pun with the stolid adverbs the late Edward L. Stratemeyer used in his Tom Swift adventure stories. (Sample from the real Tom Swift:" 'Oh, we'll dispose of him all right,' said Tom boldly.") (Unsigned article, "Swifty, He Said Gamely", *Newsweek*, June 3, 1963, pp. 81–82.)

Ralph Reppert (b. 1916) was enough of a Tom Swift fan to have adapted the title of a real Appleton book (*Tom Swift and His Electric Rifle*) for two works of his own, first an article that appeared in the *Baltimore Sun* on April 7th, and then a book (*Ralph Reppert and His Electric Wife*). He quotes the same "dispose" sentence from *Tom Swift in the Land of Wonders*, but changes the subject-verb order:

(9) Tom Swift, it will be recalled fondly, was an inventive youth with a wholesome background and wholesome friends with whom he had wholesome adventures.... Appleton, his creator, was a fast man with an adverb, and he appended one to practically everything Tom said ("Oh, we'll dispose of him all right," Tom asserted boldly.) (Ralph Reppert, "Tom Swift and His Ubiquitous Adverb: The Flamboyant Style of this Boyhood Hero Is Reborn in a New Parlor Game", *Baltimore Sun*, June 22, 1963)

Others invented illustrative quotations. The *Los Angeles Times*'s Jim Murray (b. 1919; Pulitzer Prize, 1990) led the way, followed by Bob Thomas of the Associated Press (b. 1922):

(10) But any red-blooded American boy who grew up between the years 1910–1930 will not be at all surprised if when [the first astronaut] gets [to the Moon] he bumps into a clean-cut young type.... Tom was a walking warehouse of adverbs. He could never say simply "Pass the coffee." It would be "Pass the coffee," Tom said hotly. Or, "Pass the sugar," Tom said sweetly. (Jim Murray, "Murray's Column: Tom Said, Playfully", *Los Angeles Times*, June 9, 1963, p. J1.)

(11) Well, you remember reading Tom Swift books and how the author usually modified the dialogue with an adverb: "Who says I can't go over Niagara Falls in a barrel!" said Tom bravely. (Bob Thomas, " 'Not More Swifties!' He Gagged", Associated Press, cited from the *Los Angeles Times*, July 6, 1963, p. B5)

One even tried to pass off as genuine an invented quote that is not found in *Tom Swift and his Electric Rifle*:

(12) The object of the game is to pun the stuffy, solid adverbs the late Victor Appleton used in the boys' adventure books he first started writing half a century ago. Here's a quote from the real Tom Swift:

"I'm sure my electric rifle will work," said Tom cheerfully. (Paul F. Kneeland, "'You Know, This Home Is Really Fit For a King,' Tom Asserted Regally", *Boston Globe*, July 21, 1963, p. A34.)

Some only described the game, without an illustrative non-game quotation, such as Lewis Nichols (b. 1903) of the *New York Times*, John G. Fuller (b. 1913), writing in the *Saturday Review*, and Donald Kirkley (b. 1901 or 1902) in the *Baltimore Sun*:

(13) Swifties are based on a mannerism of the heroic Tom, who often when he said something declaratively, modified it adverbially. Tom went on and on like that, peace to his soul, happy the memory. (Lewis Nichols, "In and out of books", *The New York Times*, June 2, 1963.)

(14) Fates mentioned that his whole office had been going out of its mind trying to create choice bits of dialogue for the game, which combines the old Tom Swift form of dialogue with totally ridiculous verbs, adverbs, and phrases. (Example: "I'm a plumber," he piped. Or: "My name is Bridge," he said archly.) (John G. Fuller, "Trade Winds", *Saturday Review*, May 18, 1963, pp. 10–12.)

(15) There was an explanation and demonstration of the game on Monitor [Radio] Sunday and a radio station in Boston has been broadcasting news of a weekly contest with a prize for the best Swifty submitted. The name and the game are derived from the new edition of the Tom Swift books, in which a large variety of odd adverbs are employed to emphasize what the hero says. Victor Appleton's quirk of style is exaggerated in the new fad and enhanced by single and double puns, double meanings and whatever else the ingenuity of the player suggests. (Donald Kirkley, "Look and listen with Donald Kirkley", *Baltimore Sun*, June 18, 1963, p. 12.)

(16) Tom, boy genius who invented his way thru [*sic*] 40 serial novels from 1910 to 1941, seldom merely "said" anything. It was usually "said hopefully," "said stoutly," "said wearily," or like that. ... The son, Tom Swift Jr., is a modernized (space, atomics, electronics), nonadverbial version who is going great guns with a new generation. (Unsigned article, "Let's Get on Band Wagon, Said Publishers Musically", *Chicago Tribune*, June 13, 1963, p. D8.)

(17) Tom Swifties are the latest fad to hit the literary world. They are expressions patterned after the dialogue in the Tom Swift books which thrilled boys of another generation. Tom never just plain "said" anything. He always did it with action. (Ray Erwin, "Ray Erwin's Column", *Editor and Publisher*, June 22, 1963, p. 4.)

(18) A "Tom Swifty", in case you don't know, is a play upon words patterned after the peculiar stylistic mannerism of the original Tom Swift books of years ago. Their author never had Tom just say anything outright. He was always having the manner of his deathless utterance described adverbially. (Untitled, unsigned article, *Publisher's Weekly*, 1963, Vol. 183 (April–June), p. 137.)

Recurring features of these examples are summarized in Table 1: The appeal to memory ("lingered in [their] minds", "[t]hose who remember", "it will be recalled", etc.); the explicit mention of "adverbs"; *said Xly*, especially when attributed to Tom himself; and

the quantifiers, categorical or nearly so ("never", "virtually everything", "seldom", etc.). The witnesses do not attribute their description of the Tom Swift style to a source; instead, they either explicitly make the claim on their own authority, or present it as a reminder of common knowledge. (Witness Kirkley (15) may be an exception, since his words could be interpreted to mean that he is summarizing a radio broadcast rather than commenting on it.)

		Mentions		Verb examples		
Witness	Born	memory	"adverbs"	anyone	Tom	quantifiers
3	—	yes	no	*said*	*said*	*never*
4	—	yes	no	*said*	*said*	*never*
5	—	yes	yes	*said*	*said*	*virtually everything*
6	1924	yes	yes	*said*, *cried*	*said*, *cried*	*all through*
7	1933	no	yes	*asserted, cried, explained, observed*	*asserted*	—
8	—	no	yes	*said*	*said*	—
9	1916	yes	yes	*asserted*	*asserted*	*practically everything*
10	1919	yes	yes	*said*	*said*	*never*
11	1920	yes	yes	*said*	*said*	*usually*
12	—	no	yes	*said*	*said*	—
13	1903	yes	yes	—	—	*often*
14	1913	no	yes	—	—	—
15	1901-2	no	yes	—	—	—
16	—	no	yes	*said*	*said*	*seldom, usually*
17	1906	no	no	*said*	*said*	*never, always*
18	—	no	yes	—	—-	*always*

Table 1: Recurrent features in testimony of the primary witnesses.

3. Reception of the witnesses' characterization of the Tom Swift style

The witnesses wrote for periodicals that reached many people. In 1963, the combined circulation of *Time*, *Life*, *Playboy*, and *Sports Illustrated* alone was 12.7 million per issue (Hefner and Timke 2020) in a nation of 55 million households (United States Census Bureau 2024). Since the original series sold twenty million copies (Moskowitz 1966) and was among the most popular reading for teenage boys in the 1920s (Morrison 1999:148), many audience members would have been acquainted at first hand with the style that was being parodied, and so would also have had the opportunity to point out discrepancies between

the actual style on the one hand, and the witnesses' descriptions and imitations of it on the other.

The witnesses' articles elicited a vast influx of letters to the authors and editors, but the ones that were printed, or quoted in follow-up articles, raised no objections as far as I have found. Word-game enthusiasts went on refining the schema for some years after the fad had subsided, but they, too, raised no objections that I have found (Fuller 1966:Ch. 13, Lindon 1972, Rambo and Youngquist 1973). In an article about the Stratemeyer Syndicate, Sam Moskowitz (b. 1920), a prominent science-fiction editor and historian of science fiction who had read at least some of the books, wrote affirmingly of "Tom Swift's stereotyped dialogue" as the model for Tom Swifties (Moskowitz 1966:110).

Pease et al. (1963)'s characterization of the Tom Swift style persists in many 21st-Century sources, including not only books of word games for the general public, but reference works such as *Brewer's Dictionary of Modern Phrase and Fable* (Ayto and Crofton 2009), *Garner's Modern English Usage* (Garner 2016), and *The Cambridge Encyclopedia of the English Language* (Crystal 2018) (Examples 19–21, below).[3]

(19) The quip takes its name from Tom Swift, a boy's adventure hero created by the prolific American writer Edward L. Stratemeyer in the early 20th century. Tom Swift rarely passed a remark without a qualifying adverb, as 'Tom added eagerly' or 'Tom smiled ruefully', and the wordplay arose as a pastiche of this. (Ayto and Crofton 2009:at *Tom Swifties*)

(20) Tom Swift is a fictional character created by Edward L. Stratemeyer (1862–1930) (using the pseudonym Victor Appleton), who is the hero of a series of adventure books. Almost everything Tom says includes a qualifying adverb, as in *Tom added eagerly* or *Tom said jokingly*. (Garner 2016:1032, at *Tom Swifty*)

(21) A popular game among professional writers, it is known from Victorian times. The modern name comes from a boy's adventure hero, Tom Swift, who would always speak with a following adverb ('said sadly', 'said quietly'), and the genre is based on the humorous development of this construction. (Crystal 2018:435)

I have not found any source which contradicts or casts doubt on the claims about *said Xly*. Apparently, the nationwide audiences with first-hand knowledge of the books did not point out any discrepancies in any way that left a mark on post-fad Tom Swifty scholarship.

4. Adverbial modification of *said* in the Tom Swift books

The journalistic, scholarly, and popular consensus is that *said* is conspicuously likely to be modified by an adverb, especially when the speaker is Tom himself. In relative terms, the high rate is supposed to distinguish Appleton's style from others. In absolute terms, the

[3]The remark in (21) about "Victorian times" is not explained in the text. It may refer to "Wellerisms" like *"Eaves dropping again," as Adam said when his wife fell out of the tree*, which, like Tom Swifties, are based on a humorous relationship between a direct quotation and a following matrix clause (Beardsley 1996, Litovkina 2014b).

witnesses' quantifiers (Table 1) are obviously exaggerated, but even after deflation, they seem to be describing a rate in the neighborhood of 50% (Simpson 1944, Mosteller and Youtz 1990). These claims were tested by comparing a sample of Tom Swift books to a sample of fiction that was popular in the same era.

4.1 Composition of the database

The Tom Swift sample was the 26 books at `gutenberg.org` with "Victor Appleton" as author and "Tom Swift" in the title. These books belonged to the original 40-volume Tom Swift series, which ran from 1910 to 1941. Twenty-five were published before 1923, and one appeared in 1939. A second, 33-volume series under the pen name "Victor Appleton II" started in 1954 and ran until 1971. Only two were found on `gutenberg.org`, both published in 1961. They were included but kept separate from the first series. The comparison sample consisted of works by prolific early-20th-Century writers of popular fiction in English, two from each of six genres (Table 2), chosen by the author on the basis of non-specialist knowledge and informal research on the World Wide Web (e.g., the "20th-Century American Bestsellers" list[4] at the University of Virginia Library.) All were popular in the United States, regardless of their own national origin. All of each author's Gutenberg works were included, even ones that fell outside the genre the author was chosen to represent. All books were accessed in May of 2024.

Author	Titles	Words	Genre
Appleton, Victor*	26	1 102 000	Tom Swift
Appleton, Victor, II*	2	67 312	Tom Swift, Jr.
Brand, Max	17	1 040 187	Western
Burnett, Frances Hodgson	41	2 055 501	Children's
Burroughs, Edgar Rice	25	1 811 843	Adventure
Carter, Nicholas*	45	1 869 404	Dime novel
Dell, Ethel M.	16	1 876 097	Romance
Doyle, Arthur Conan	58	3 280 350	Mystery
Glyn, Elinor	15	996 918	Romance
Grey, Zane	23	1 980 348	Western
Haggard, H. Rider	24	1 971 488	Adventure
Matthews, Stanley R.*	32	1 067 530	Dime novel
McCutcheon, George Barr	30	2 312 376	Children's
Rinehart, Mary Roberts	25	1 581 684	Mystery

Table 2: Corpus of works used. Asterisk denotes pseudonyms of collaborative authorship.

[4] `https://bestsellers.lib.virginia.edu/`

4.2 Data cleaning and processing

All available works by these authors were downloaded from `gutenberg.org` using the `gutenbergr` package in R (Johnston and Robinson 2023). The texts were converted to plain ASCII text and split into "sentences" using the `unnest_tokens ()` function in the `tidytext` package (Silge and Robinson 2016). Because this procedure often left direct quotations separated from the matrix sentence, pairs of successive "sentences" were concatenated if the first ended in a question mark, exclamation point, or comma, followed by a single or double quote, and the second contained *said* that was not preceded by any punctuation. These were then winnowed down to those sentences that contained a single or double quote followed, after any number of unpunctuated words, by *said*.

The resulting sentence corpus was scanned to mark *said Xly*s versus plain *said*s. A sentence was classified as *said Xly* if the *said* was followed, not necessarily immediately, by an all-lower-case word ending in *-ly* before the next punctuation mark. An optional single comma plus space was allowed to immediately precede the *Xly* in order to accommodate sentences like *"Glad you did," said Tom, heartily*. An ad-hoc stop list was used to avoid counting non-adverbial *-ly* words like *only, fly, jolly*, as well non-manner adverbs like *entirely, apparently, presently*, etc. About 2% of positives in a sample of 400 were false, e.g., *"I humbly plead for forgiveness," he said, suddenly contrite*. They were retained in the analysis. The sentences for each author were pooled across titles; i.e., each sentence was weighted equally, so that within an author's corpus, shorter books affected the counts less than longer books.

4.3 Results

Figure 2 plots *said Xly*s vs. *said*s in each title of the corpus, and counts are shown in Table 3. There is nothing extraordinary about the Appleton books. They rank 10th out of 14 in the rate at which *said* was followed by an adverb. Appleton attaches an adverb to less than 12% of his *said*s, far less than the 50% or more that the witnesses claimed to recall. On average, each Tom Swift book contains about 11 *said Xly*s.

Figure 2: Occurrences of *said* and of *said Xly* in each Gutenberg title (log scale on both axes). For a given *x*, larger *y*s mean more adverbial modification of *said*. The Appleton Tom Swift corpus is marked by solid-color points inside black rings.

	said			
Author	*Xly*	all	Ratio	Rank
Appleton	292	2575	0.113	10
Tom only	*151*	*860*	*0.176*	*6*
Appleton II	54	235	0.230	3
Brand	848	3883	0.218	4
Burnett	910	12736	0.072	13
Burroughs	157	3437	0.046	14
Carter	758	5602	0.135	8
Dell	2854	19141	0.149	6
Doyle	888	9672	0.092	12
Glyn	341	2880	0.118	9
Grey	748	4123	0.181	5
Haggard	435	4388	0.099	11
Matthews	447	3177	0.141	7
McCutcheon	3011	10072	0.299	1
Rinehart	2067	8650	0.239	2

Table 3: Proportion of *said Xly* among quotations with *said*, ranked from highest to lowest.

Perhaps the adverbial style was typical only of Tom himself, and not of other characters in the Appleton books? Several of the witnesses suggest this possibility (3, 4, 9, 10, 13, 16, 17, 18). The italicized line in Table 3 shows the counts for the original Appleton books, restricted to the subset of corpus sentences in which the word *Tom* occurs after the last quotation mark. The Tom subcorpus indeed has a higher rate of *said Xly* than the Appleton corpus as a whole, but only 18%, enough to put it in 6th place if it stood alone.

Were the witnesses thinking, not of the original Tom Swift books they actually read in their own childhood, but of Victor Appleton II's Tom Swift, Jr., books that their own children might have been reading in the early 1960s? Twenty had already been published before 1963, and they are in third place in Table 3. However, the evidence indicates otherwise. The witnesses' flights of nostalgia unambiguously refer to their own childhoods. They write of "Tom Swift" and "Victor Appleton", not "Tom Swift, Jr." and "Victor Appleton II", except perhaps (15)'s ambiguous mention of "the new edition of the Tom Swift books". The titles listed by witness Leavitt (6) are all from the original series. Witnesses Leavitt (6), Reppert (9), and Doolittle (7) quote verbatim from *Tom Swift and His Air Scout* (1919) and *Tom Swift in the Land of Wonders* (1917). Finally, author Paul Pease and his brother Earl Pease, Jr., stated that their family was playing the game in Minneapolis as early as 1953, before any of the second series had been published (John G. Fuller, "Trade Winds", *Saturday Review*, May 18, 1963, pp. 10–12; Dick West, "San Franciscan Makes Literary Spot For Himself With Tom Swift", *San Rafael Daily Independent Journal*, June 12, 1963, p. 30; Earl W. Pease, Jr., letter to the editor, *Television Age*, July 8, 1963, p. 21).

Perhaps the witness were thinking, not of the 26 books in the sample, all but one of which appeared before 1923, but of the 14 unsampled books, all of which appeared in 1923 or later? The later books may have been written in a more adverbial style. The lone "late" book that does appear in the sample (*Tom Swift and His Giant Telescope*, published in 1939) has an adverbial-modification rate of 21.1%. That is markedly higher than the pre-1922 Appleton average. However, the 1939 book still lies within the range of the pre-1922 Appleton books (3.8% to 25.8%), and below the averages for comparison authors McCutcheon, Rinehart, and Brand. In addition, all of the books whose titles are mentioned by the witnesses belonged to the sample.

Hence, unless there is a surprise lurking in the non-sampled books, adverbially-modified *said* is not a stylistic quirk of the Tom Swift books, let alone more frequent than unadorned *said*, regardless of what people with first-hand knowledge of those books said they recalled in 1963.[5]

[5] Another disparity involves the order of matrix subject and verb. Following a direct quotation in the actual Appleton corpus, *said Tom Xly* and *said Tom, Xly* occur 128 times, whereas *Tom said Xly* and *Tom said, Xly* occur only 9 times (excluding cases where other words appear in between *Tom*, *said*, and *Xly*). Pease and McDonough use only the more Appleton-consistent *said Tom* order. They even sued Rust Craft Greeting Cards, Inc., of Dedham, Massachusetts, over the rights to the phrase "said Tom" (unsigned article, "Swiftly Solve Swifty Study, Say Suers", *Dixon (Illinois) Evening Telegraph*, September 5, 1963, p. 1.). However, some of the primary witnesses attributed the *Tom said* order to Appleton's books (5, 9, 10, 14). Here again, the syntax has changed, but the semantics has not.

5. Adverbial modification of other quotative verbs

Perhaps we have to look beyond *said* to other quotative verbs in order to find the adverbial style so vividly recalled by the witnesses. Witnesses Leavitt (6), Reppert (9), and Doolittle (7), who quote genuine sentences from the Tom Swift books, give examples of this sort. For this purpose, a list of 111 past-tense quotative verbs was collected from the 1911 edition of *Roget's Thesaurus*, based on the judgements of the author of this paper, whose first language is American English.[6] When the counts were redone, allowing any of them as well as *said*, the results were as shown in Figure 3 and in Table 4. Appleton ranks 12th out of 14 in the proportion of quotative verbs that were modified adverbially. Even Tom himself would only rank 8th if he stood alone.

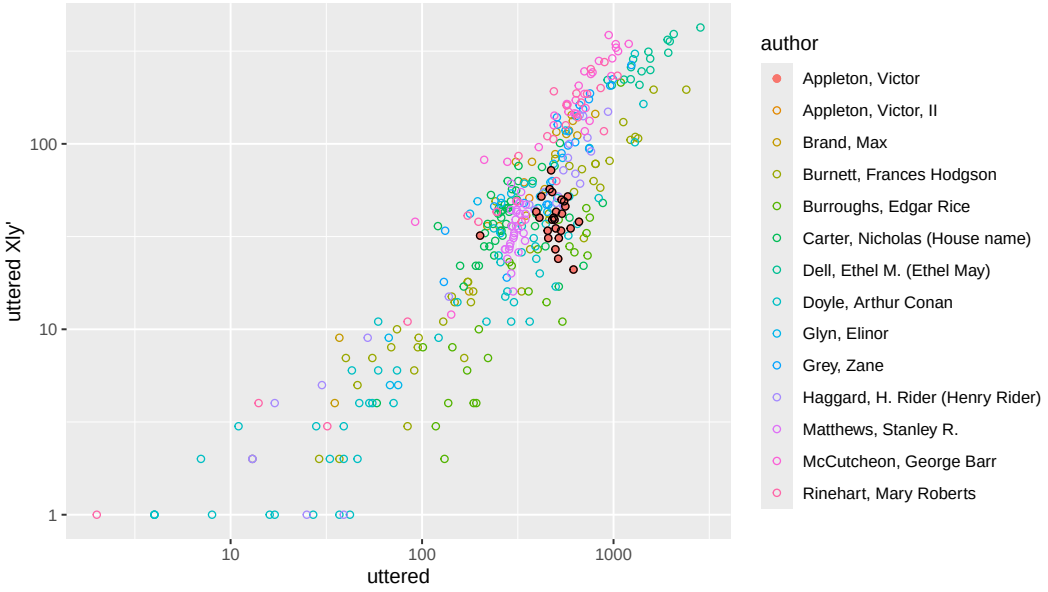

Figure 3: Occurrences of quotative verbs and of quotative verbs followed by *Xly* in each Gutenberg title (log scale on both axes). For a given *x*, larger *y*s mean more adverbial modification of quotative verbs. The Appleton Tom Swift corpus is marked by solid-color points inside black rings.

[6]Specifically: *acknowledged, affirmed, agreed, alleged, answered, articulated, asked, asserted, bawled, begged, bellowed, beseeched, blared, blurted, boasted, boomed, breathed, complained, confided, coughed, creaked, cried, croaked, declared, demanded, denied, drawled, echoed, ejaculated, entreated, enunciated, exclaimed, explained, expostulated, exulted, grated, groaned, grumbled, grunted, hinted, hissed, hooted, howled, implored, informed, inquired, insinuated, insisted, interrupted, invited, jabbered, jeered, jubilated, lamented, laughed, lisped, moaned, mouthed, mumbled, murmured, muttered, piped, pleaded, prayed, professed, prompted, pronounced, protested, quavered, rejoiced, rejoined, replied, reproached, requested, retorted, roared, said, scoffed, screamed, screeched, shouted, shrieked, sighed, snarled, sneered, snorted, sobbed, spat, spluttered, sputtered, squeaked, squealed, stammered, stated, stuttered, swore, thundered, told, twanged, uttered, vouchsafed, vowed, wailed, wheezed, whimpered, whined, whispered, whooped, wondered, yelled, yelped.*

Author	uttered *Xly*	uttered all	Ratio	Rank
Appleton	1005	12866	0.078	12
Tom only	*473*	*3999*	*0.118*	*8*
Appleton II	105	699	0.150	6
Brand	1240	6982	0.178	4
Burnett	1557	20130	0.077	13
Burroughs	414	9936	0.042	14
Carter	1678	14080	0.119	8
Dell	4013	24843	0.162	5
Doyle	1497	17022	0.088	11
Glyn	602	4519	0.133	7
Grey	2396	13164	0.182	3
Haggard	1083	9754	0.111	9
Matthews	1078	9785	0.110	10
McCutcheon	5009	19725	0.254	1
Rinehart	2570	11898	0.216	2

Table 4: Proportion of *[uttered] Xly* among all direct quotations embedded under quotative verbs, ranked from highest to lowest.

The outlier point in Figure 3 belongs to the lone post-1922 book in the Appleton sample, *Tom Swift and his Great Telescope* (1939). If it is typical of the later books, then the 14 post-1922 books that were not in the sample would have been more adverbial than the 26 earlier books that were in the sample. However, if they were included in Table 4 as a separate group, their rate of 0.155 would qualify for 6th place, barely ahead of Appleton II and not extreme relative to the comparison authors.

6. Choice of quotative verb

Where Tom Swift's author actually stands out is not in how he modifies his quotative verbs, but in which verbs he uses. Figure 4 and Table 5 rearrange information from Tables 3 and 4 to show the proportion of *said*s among all of the listed verbs that follow quoted dialogue. Only 20% of Appleton's quotative verbs are *said* — a proportion which could fairly be called "not often" or "infrequent" (Mosteller and Youtz 1990:Table 2). It is the most extreme in the sample by a wide margin, well below runners-up Grey and Matthews at about 32%. The 17 Appleton books published between 1910 and 1914 are especially extreme, with only 15% *said*, while the 9 post-1914 books in the sample have an average rate of 27%, which is still lower than any non-Appleton author in the sample. The lone post-1922 book in the sample, 1939's *Giant Telescope*, is again an outlier relative to the other Appleton books, but it is an outlier only in the low token count of quotative verbs, not in the proportion of those verbs that were *said*, which was 28%. If the other 14 post-1922

books (the ones which were not available for sampling) are like that one, then including them would not affect Appleton's rank in Table 5.

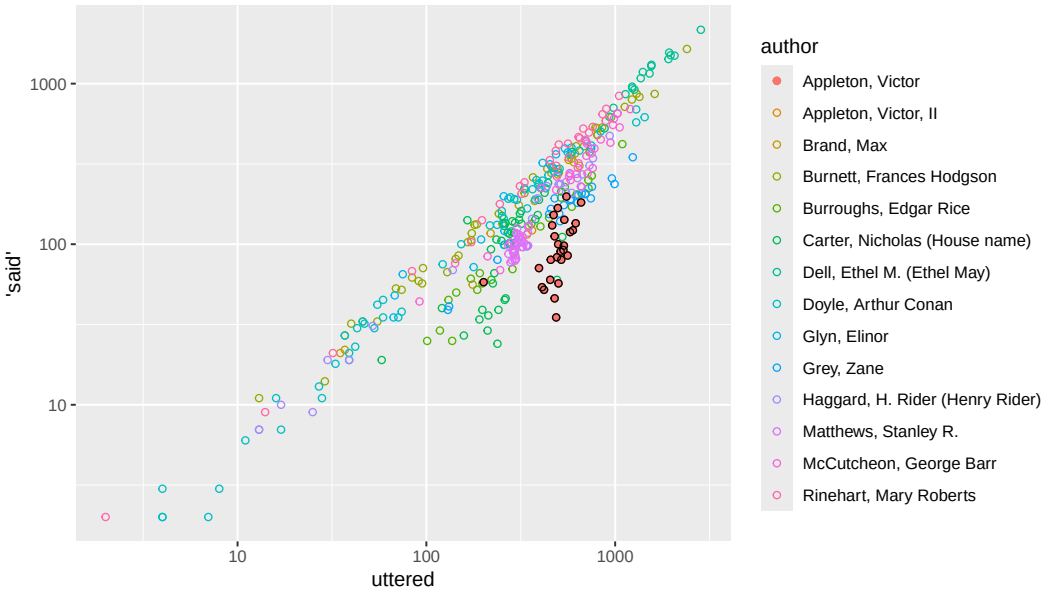

Figure 4: Occurrences of *said* and of all quotative verbs in each Gutenberg title (log scale on both axes). For a given value on the *x*-axis, smaller values on the *y*-axis mean a smaller proportion of *said* among past-tense quotative verbs. The Appleton Tom Swift corpus is marked by solid-color points inside black rings.

Author	*said*	uttered	Ratio	Rank
Appleton	2575	12866	0.200	1
Tom only	*860*	*3999*	*0.215*	*2*
Appleton II	235	699	0.336	4
Brand	3883	6982	0.556	9
Burnett	12736	20130	0.633	11
Burroughs	3437	9936	0.346	5
Carter	5602	14080	0.398	6
Dell	19141	24843	0.770	14
Doyle	9672	17022	0.568	10
Glyn	2880	4519	0.637	12
Grey	4123	13164	0.313	2
Haggard	4388	9754	0.450	7
Matthews	3177	9785	0.325	3
McCutcheon	10072	19725	0.511	8
Rinehart	8650	11898	0.727	13

Table 5: Proportion of *said* among all direct quotations embedded under quotative verbs, ranked from lowest to highest.

In other words, the real analogue of the Tom Swift style is not the adverbial Tom Swifty of Pease et al. (1963), but the "croaker". Croakers evolved very early in the 1963 fad. The type specimen, *"I'm dying," he croaked*, though attributed to Bongartz (1972) by Rambo and Youngquist (1973) and Espy (1975:30), already appears as *"I might as well be dead," he croaked* in the *Time* article of May 31st from which (3) is excerpted. Other instances can be seen in (14) on May 18th, and in the title of (11) on July 6th, and they were being manufactured in quantity soon thereafter (Fuller 1966:Ch. 13). Croakers are now usually regarded as a variety of Swifty, though the canonical Swifty remains the *said Xly* version (Litovkina 2014a). Appleton's penchant for non-*said* quotatives is not explicitly mentioned by the primary witnesses, or, as far as I know, by anyone before Israel (1993) and Aronson (2008) — and even they endorse the *said Xly* claim.

Appleton's palette of non-*said* quotatives is not much different from that of the other authors. Just 14 verbs account for 90 percent of the non-*said* quotatives in the Appleton corpus. In descending order of frequency, they are *asked, cried, exclaimed, answered, replied, declared, agreed, murmured, yelled, explained, laughed, shouted, demanded, told*. In the comparison set (excluding both Appleton and Appleton II), the corresponding list has 24 verbs: *asked, cried, answered, replied, exclaimed, told, whispered, demanded, muttered, inquired, murmured, declared, laughed, shouted, interrupted, explained, protested, yelled, agreed, ejaculated, retorted, roared, groaned, insisted*.

7. Discussion

The witnesses had experienced Appleton's frequent use of non-*said* quotative verbs and sparing use of *said*-plus-adverb, yet they endorsed *said*-plus-adverb as authentic and characteristic of the Appleton style. The endorsements, which applied both to the meta-linguistic description of the style and to sentences made up in imitation of it, seem to have been accepted without contradiction by audiences that were acquainted with the books. This section discusses, in decreasing order of likely interest to linguists, three factors that might have caused or contributed to the discrepancy: differential forgetting rates in linguistic memory, false memories, and journalistic failure.

7.1 Differential forgetting

If the witnesses' endorsements really were based on their own memory of the books — a big "if", to which we will return shortly — then they apparently misremembered Appleton's unusually high rate of non-*said* quotatives as an unusually high rate of adverbially-modified *said*s. Non-*said* quotatives and adverbially-modified *said*s both have marked semantics. Sometimes they have nearly identical semantics; e.g., *exclaimed* and *said excitedly*, or *declared* and *said confidently*. These semantic features remained salient to the witnesses, but syntactic and lexical features were misremembered: The unadorned verb was misremembered as verb-plus-adverb, and *said*, which was unusually rare, was misremembered as unusually frequent. Thus, witnesses' mental representation of the style generalized from experience *along* lines of semantic similarity but *across* lines of syntactic and lexical difference, a pattern that we might call the *Tom Swift illusion*. This pattern is unexpected under Brewer and Hay (1984)'s proposal that style cues are mainly syntactic and lexical, and suggests that semantic cues can outweigh syntactic and lexical ones.

A possible explanation lies in the different rates at which different structural levels of a sentence are forgotten during reading. Across multiple levels of linguistic structure, perceptually-earlier, more-concrete representations fade faster than perceptually-later, more-abstract ones. At one end of the scale, short-term auditory memory fades faster than phonetic memory, which fades faster than phonological memory (Pisoni 1973, Werker and Logan 1985). At the other, long-term memory fades faster for incidental details of a story than for its gist (Sacripante et al. 2023). In the middle, memory for the exact wording of a sentence fades faster than memory for its meaning — so much faster that at one time it was widely believed that the wording was wholly forgotten (reviewed in Gurevich et al. 2010, Hamrick 2014, Kuhbandner 2020).

In short-term memory, within tens of seconds after a sentence is heard or read, it becomes hard to distinguish from a paraphrase with different syntax, whereas semantic changes remain salient (Sachs 1967, 1974, Anderson 1974, Graesser and Mandler 1975). If a lure (a word that suggests a specific paraphrase) is offered between initial presentation and later recall of a sentence, it can prime corresponding changes in both the vocabulary and the syntax of the recalled sentence (Potter and Lombardi 1990, Lombardi and Potter 1992). To commit their lines to long-term memory, actors must normally study hard (Intons-Peterson and Smyth 1987, Noice and Noice 1996). Months later, lines learned ver-

batim are often recalled as as semantically-equivalent paraphrases (Schmidt et al. 2002). Non-actors can memorize a short passage, like the 23rd Psalm or the Preamble to the U.S. Constitution, so durably that they can recite it verbatim years later (Rubin 1977, Calvert and Tart 1993), but that, too, takes deliberate effort. It does not happen automatically as an incidental by-product of reading (Gurevich et al. 2010:Exp. 5).

Brewer and Hay (1984) argue that, *because* form is forgotten faster than content, mental representations of style are used to reconstruct the forgotten lexical and syntactic form when recalling a recently-encountered passage. The mental representations themselves are taken, in that proposal, as pre-existing. However, at some earlier time they must have been derived from memory traces left by reading. Those traces would have undergone the same sort of differential forgetting, so that syntactic and lexical factors would have been filtered out of the data used to build the representation of style. Hence, syntactic and lexical cues are bound to be attenuated in the style representation relative to semantic cues. This matches the pattern observed in the Tom Swift illusion.

More generally, the memory-filtering hypothesis predicts that if a semantic feature $\pm S$ and a syntactic or lexical feature $\pm F$ are equally predictive, statistically, of Source *A* vs. Source *B*, are equally frequent, and are of equal salience when tested immediately (e.g., in a monitoring task), then *A*-*B* classification, discrimination, and generation should be influenced more strongly by $\pm S$ than by $\pm F$. Increasing the delay between familiarization and test should only widen the gap. This qualitative prediction does not depend on whether responses are based directly on the memory traces themselves, versus on a mental model abstracted from them after they are laid down. On the other hand, if the style-learning process updates the style model immediately, during reading (analogously to the immediate update proposed in some theories of language learning, e.g., Bybee 2010:18, Christiansen and Chater 2016), then differential forgetting ought not to affect it.

There seems to be no reason why the effect should be limited to prose style, or to semantic vs. syntactic and lexical features: Generalization from memory ought to overweight cues that are better-remembered, the more so the longer the lapse between exposure and formation of the mental representation underlying generalization. Deviations from that pattern demand an explanation, in terms of (e.g.) domain-specific biases, differences in attentional focus during initial encoding, or differences between implicit and explicit learning (Culbertson et al. 2017, 2019, Pertsova and Becker 2021).

7.2 False memories

Returning to that "if": The foregoing assumes that the witnesses' testimony was based entirely on their own first-hand experience of the books. As journalists, they were (presumably) practiced readers and writers, attentive to prose style, subjectively truthful, and accustomed to weighing evidence. However, that the witnesses sincerely believed they were consulting their childhood memories does not mean that they really were. They could instead have mistaken Pease and McDonough's description and examples for their own memories, i.e., committed a source-monitoring error (Johnson et al. 1993).

The witnesses were adult readers whose memories of the original books had likely not been refreshed in decades. The only sentences they had encountered since then that

were labelled as instances of the Tom Swift style would have been Tom Swifties. Pease and McDonough's book not only told the witnesses that the Tom Swift style had a certain property; it invited them to *remember* the style as having that property (Example 1, above). This invitation was paired with social reinforcement from early adopters of the fad, as described in Examples (14), (15), and (17). All three of these factors — authority, guided imagination, and social reinforcement — are known to facilitate memory errors for events (e.g., a childhood ride in a hot-air balloon that never happened), facts (e.g., that the capital of Russia is St. Petersburg), and words (e.g., intrusion of *sleep* when recalling a list like *drowsy, bed*, etc.) (Johnson et al. 1993, Fazio et al. 2013, Marsh et al. 2016, Maswood and Rajaram 2019). Perhaps the same is true for childhood memories of prose style. Witnesses who followed Pease and McDonough's schema in retelling the tale (Table 1) then administered to their own public the same treatment they had themselves received, with similar likely effects.

On the other hand, the effects in the false-memory experiments consist of more participants making more errors in the critical condition, not of fooling all of the people all of the time as Pease et al. (1963) seem to have done (Brewin and Andrews 2017, Nichols and Loftus 2019). Participants in false-memory experiments also reject pseudo-facts that mismatch their prior knowledge too much (e.g., that the capital of Russia is Brasilia; Hinze et al. 2014), so Pease et al.'s assertions and imitations must have fit witnesses' mental representation of the Tom Swift style closely enough to evade detection.

7.3 Journalistic failure

There remains the possibility that some journalist-witnesses were simply repeating the story without any critical reflection at all. The recurrence of Example (1)'s phrases "stylistic mannerism" and "deathless utterance" in (18), for instance, raises suspicions, as does the spurious quotation in (12), and the repetition of the same genuine quotation in (7), (8), and (9). Witness Kirkley's statement (15) may mean that he is merely repeating something he heard on the radio. Some witnesses did quote genuine examples, showing that they checked the books, but rigorous fact-checking would have been hard without machine-readable texts, and it would likely have been a low priority for a low-stakes story that was such fun to propagate. And just as scientists can fall prey to self-deception, confirmation bias, and social contagion, so can journalists (Vogt and Hyman 1959, Udry 1970, Klotz 1980, Izenman and Zabell 1981, Brunvand 1990, Spellberg and Taylor-Blake 2013). In the most extreme scenario, the witnesses' statements could all be uninformative pseudo-replications of a memory error that was made only once, by someone in Pease's family in Minneapolis in the early 1950s.

Temptation might have been hard to resist. The interlocking game, name, and origin story formed a mutation-resistant meme complex. It made good telling at parties, and could be turned into a newspaper column of any desired length by adding more Swifties. Interrupting the fun to point out the discrepancies might have seemed petty. However, uncritical copying could not easily account for the statements of witnesses who did have first-hand knowledge, nor for the apparent lack of objections from millions of knowledgeable newspaper readers.

8. Conclusions

The discrepancy between the actual Tom Swift style on the one hand, and Pease et al. (1963)'s characterization and imitation of it on the other, seems to be very difficult to notice unless you have a computer to notice it for you. There are potentially interesting psycholinguistic reasons why that might be so, but because other factors may be involved, the historical facts can only be suggestive and not probative. Although a fad is not a controlled experiment, it may yet inspire a few.

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