

Passive voice in student technical writing: gender or genre?

Stefanie Wulff

Ryan K. Boettger

5th International Conference on Writing Analytics
11–12 January 2018, St. Petersburg (Florida)



Road Map

Today, we will ...

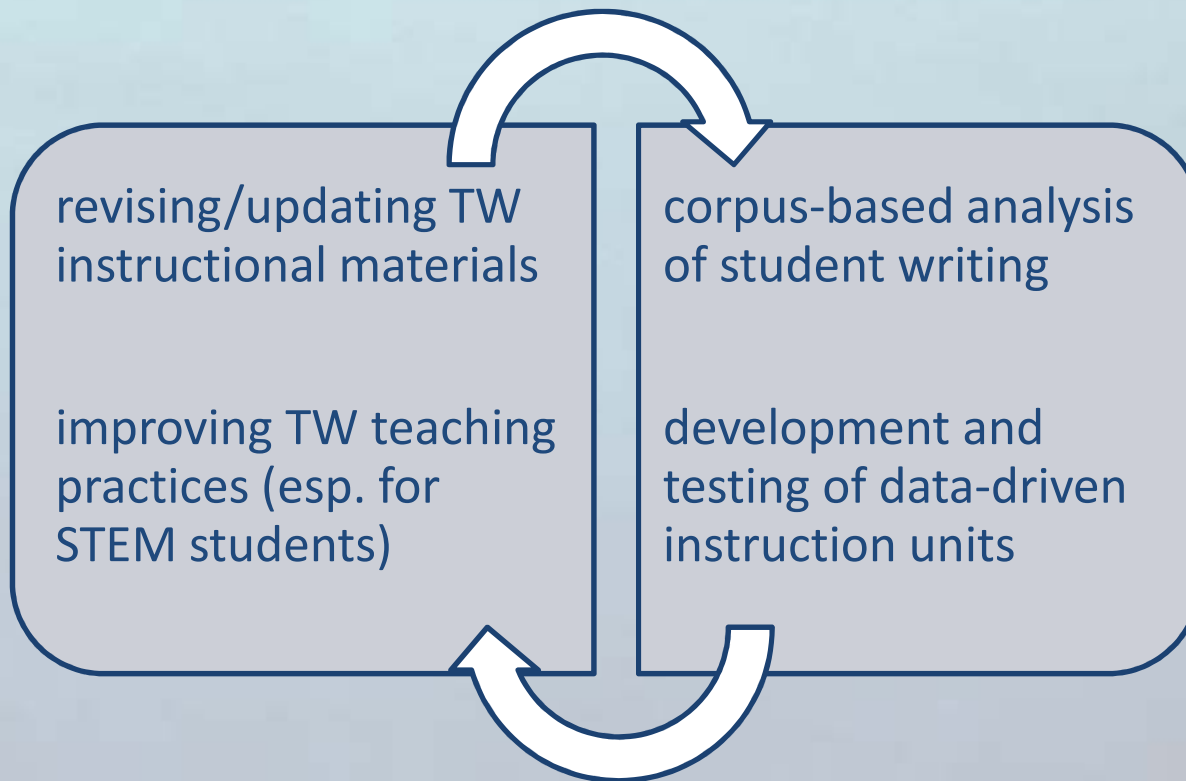
- situate this talk in our larger research agenda
- give a compact review of literature on the use of passive voice
- summarize what we know thus far about gender effects in adolescent and adult writing
- explain the composition of our data sample
- present the results of a corpus-based analysis of passive verbs distinctly associated with female and male student writers
- draw conclusions from our study
- outline directions for ongoing and future research

The Technical Writing Project (TWP)



- www.technicalwritingproject.com
- corpus compilation started in 2011; by the end of December 2017, we have inventoried and converted 6,000+ texts (>3 million words) into TEI-compliant txt-files
- from 900+ students representing 40+ different academic majors
- covering 40+ text types (resumes, instructions, bad-news memos, white papers, briefing notes, LinkedIn summaries, reflections, responses ...)
- 76% of texts are original drafts, 24% are revised drafts

Our Research Agenda



TWP Research Projects



- demonstrative pronouns (Boettger & Wulff 2014)
- adverbs (Boettger & Wulff 2018)
- passive voice construction (today's presentation; Boettger & Wulff 2018)
- STEM writing patterns (Boettger & Wulff 2016)
- integrating corpus learning into the TW classroom (Boettger, Wulff and Anthony 2016)

Previous Research On Passive Voice

- is used/preferred when the **agent is unknown** and/or unimportant [Conrad et al. 2009]
 - can help with **delivering bad news, creating cohesion** and focus between ideas, or meet reader's scientific **writing expectations** [Biber et al. 2002; Conrad 1996; Rude & Eaton 2011]
 - is **rare in conversation** [Biber et al. 2002]
 - accounts for 25% and 15% of finite verb forms in academic and news writing, respectively, and as much as 67% of transitive verbs in professional engineering texts [Ding 2001]
- ... plays a notorious role in technical writing:
- most researched clarity marker in the field, suggesting **many legitimate uses** [Ding 2001, Converse 2012]
 - however, textbook authors spend more time **deterring students** from using passives than explaining legitimate uses [Wolfe 2009]

Gender Effects in Adolescents' Writing

- standardized tests reveal **gender differences across multiple school subjects**; writing in particular remains an area where boys significantly underperform compared to girls [Hedges & Nowell 1995; Pargulski & Reynolds 2017]
- boys are often considered analytical writers or writers of **plot-driven narratives**, while girls are associated with the **emotive descriptions** common to the approved "literary canon" promoted in most English classrooms [Jones 2007:97]
- Millard described **boys as "differently literate"**: the texts they choose to read do not reflect the figurative and descriptive language they are required to write in school [Millard 2002]
- some evidence suggests that teachers **evaluate narratives higher** when they perceive the writer as **female** [Peterson 1998]
- the **gender gap seems to narrow** when writers produce writing used to report, explain, persuade, and instruct [Parr 2010]

Gender Effects in Adults' Writing

- previous research identified **significant differences** in how females and males use at least 16 different language features [see Mulac et al. 2001 for overview]
- females often use words related to **psychological and social processes**; males refer more to **objective properties** and impersonal topics [Mulac & Lundrell 1986, 1994; Newman et al. 2008]
- males and females perceive accounts of domestic violence differently when framed in passive rather than active voice:
 - writers often use passive voice in domestic violence situations when the perpetrators are male [Frazer & Miller 2009]
 - “[w]ith passive voice, males, but not females, attributed less victim harm and perpetrator responsibility ... than with active voice. Both females and males showed more acceptance of [violence against women] with passive voice use” [Henley et al. 1995]

Research Question



Does a student author's gender impact their use of the passive?

Data

- subset of TWP
- 87 student writers enrolled in one of five sections of three TW courses:
 - sophomore-level course in technical writing (14 females, 19 males)
 - senior-level scientific writing course (29 females, 14 males)
 - graduate-level course in academic and professional writing (3 females, 8 males)
- 65.5% of students were enrolled in a STEM major, 28.7% in the humanities, and 5.7% in business
- students completed an average of 8.5 assignments
- students averaged 84.48% on their assignments ($sd = 7.53$); the grade distribution for females ($M = 84.86\%$, $sd = 7.38$) compared to males ($M = 83.28$, $sd = 7.94$) was not statistically significant ($p = 0.23$)

Passives Retrieval

- we searched for any form of the verb *BE* (*am, be, is, are, were, has been, have been, had been, having been*) in AntConc
- 15,437 candidate hits were manually inspected to identify 4,732 true passives
- 2,569 instances produced by female writers and 2,163 instances produced by male writers ($p_{\text{binomial}} < .001^{***}$)
- a passive occurred ~every 160 words
- 622 different verbs in the passive, with female writers using 430 different verbs and male writers 388 different verbs
- the vast majority of all verbs ($n = 592$) was shared between female and male writers
- the most frequent passive voice verbs included *BE used* ($n = 446$, or 9.43% of the sample), *BE done* ($n = 159$, 3.36%), *BE made* ($n = 108$, 2.28%), and *BE found* ($n = 100$, 2.11%)

Distinctive Collexeme Analysis

- DCA is a corpus-linguistic analysis that was originally designed to enable the identification of words that are distinctly associated with two or more alternating syntactic constructions [Gries & Stefanowitsch 2003]
- DCA has been applied in various contexts, including word sense disambiguation, characterizing differences between language varieties such as British vs. American English, and identifying differences of language use across different time periods [e.g. Hilpert 2006; Wulff et al. 2007]
- we applied DCA to identify passives distinctively associated with either female or male writers using Gries' *R*-script coll.analysis3.2a [Gries 2007]
 - input: list of all instances of passives together with information about the gender of the author of each instance
 - output: list of all verbs in descending order of their association with either female or male writers as expressed by a (log-transformed) Fisher-Yates exact (FYE) test

Results: Female Student Writers

Verb	n_{female}	n_{male}	FYE value
find	76	24	5.315
expose	19	0	5.054
educate	17	0	4.520
place	31	5	4.287
force	23	2	4.277
post	15	0	3.987
know	52	16	3.926
believe	18	1	3.820
minimize	14	0	3.721
take	50	16	3.618
need	25	4	3.549
pass	12	0	3.188
cause	24	5	2.895
show	24	5	2.895
diagnose	14	1	2.851
remove	20	4	2.545
infect	9	0	2.390
relate	9	0	2.390
release	12	1	2.376
publish	21	5	2.336

Results: Female Student Writers

(1) This gives the students the idea that they can participate in risky behaviors because they believe they are “sober enough” to have control. In addition, it has **been found** that students who often mix their drinks are likely to drink more alcohol than those who do not mix (Kponee et. al., 2014).

[biology major in her sophomore year, briefing note]

(2) As discussed above, gap junctions, specifically those with connexin43, **are believed to be** major players in cardiac function.

[biology major in her senior year, white paper]

(3) Predictive factors of NAS include maternal opiate dose, maternal maintenance agent, secondary exposure to additional substances, gestational age and pharmacogenetics. These factors have **been shown** to influence the severity and treatment of NAS in infants.

[biology major in her senior year, white paper]

Results: Male Student Writers

Verb	n_{male}	n_{female}	FYE value
use	288	158	16.512
create	59	19	7.243
perform	48	18	5.163
grow	17	1	4.783
model	11	0	3.746
recharge	11	0	3.746
call	33	13	3.527
fill	13	1	3.521
compare	17	3	3.468
appreciate	9	0	3.064
propel	9	0	3.064
employ	17	4	2.989
amplify	7	0	2.382
join	7	0	2.382
mandate	7	0	2.382
mark	7	0	2.382
power	7	0	2.382
trust	7	0	2.382
calculate	11	2	2.322
implement	18	7	2.154

Results: Male Student Writers

(4) For example, a family could decide that they will not use their dishwasher until it is completely full. This may seem miniscule, but it actually could save 15 to 20 gallons of water per day. The same method could **be used** to do laundry as well (Dupont, 2013).

[construction management Master's student in his first year, white paper]

(5) A company's revenue is the amount of money the company receives in exchange for its goods and services. Revenue can **be calculated** by multiplying the amount of goods or services sold and the price the goods and services were sold.

[math major in his senior year, briefing note]

Results: STEM-majoring Student Writers

Verb	n_{STEM}	n_{non-STEM}	FYE value
find	93	7	4.709
associate	36	0	4.073
know	63	5	3.191
measure	22	0	2.485
show	28	1	2.293
compare	20	0	2.258
provide	26	1	2.095
grow	18	0	2.032
determine	17	0	1.919
educate	17	0	1.919
produce	17	0	1.919
increase	16	0	1.806
base	23	1	1.800
detect	15	0	1.693
diagnose	15	0	1.693
do	133	26	1.580
link	14	0	1.580
minimize	14	0	1.580
propose	14	0	1.580
recognize	14	0	1.580

Results: STEM-majoring Student Writers

(6) Existing solutions use hardware for enforcing isolation and measuring the entities. This process forces the entity to **be measured** and verified...

[doctoral student in computer science and computer engineering in his fifth year, abstract]

(7) No images are included in this section of the paper, but several pages of illustrations and graphs can **be found** at the end of the article after the list of references.

[biochemistry major in his junior year, white paper]

(8) In addition to fine grained microstructures, the technique has a considerable impact on precipitation strengthened alloys and will **be shown** in the sections to follow.

[physics major in his senior year, critical review]

Results: non-STEM-majoring Student Writers

Verb	n_{STEM}	n_{non-STEM}	FYE value
give	11	21	6.571
propel	0	9	5.781
force	8	17	5.738
implement	9	16	4.916
report	39	33	4.909
contaminate	0	7	4.494
power	0	7	4.494
restrict	0	6	3.851
conduct	34	27	3.801
bill	0	5	3.209
favor	0	5	3.209
locate	0	5	3.209
prepare	4	8	2.833
teach	4	8	2.833
condition	0	4	2.566
deem	0	4	2.566
kill	0	4	2.566
run	0	4	2.566
shift	0	4	2.566
stop	0	4	2.566

Results: nonSTEM-majoring Student Writers

(9) If information **is** to be **deemed** reliable and without regard to hidden agendas, the government must.

[technical communication major in her senior year, white paper]

(10) If any employees do not adhere to the social media policy as stated...the human resources department will **be forced** to take action.

[criminal justice major in her senior year, policy memo]

(11) Each subject had to determine what kind of punishment the NPC would receive by choosing from a list of pre-created dialogue options. The NPC could either **be killed** or arrested depending on what kind of punishment the subject thought best for the situation.

[English major in his senior year, abstract]

Conclusions

- students use passives in meaningful ways
- female writers use the passive far more often than male writers
- female and male writers use the passive for different purposes: female writers use the passive to report and interpret findings; males use the passive to describe methods of analysis
- STEM-majoring students associated with a number of verbs common in research writing, nonSTEM majors did not

Outlook



- more comprehensive multifactorial study including gender and academic major, native speaker status, ethnicity, text type, final grade, and potential interactions (!) into account
- include passive and active voice attestations to model constructional choice more reliably
- gauge the appropriateness of passives more systematically by including expert judgments
- develop usage recommendations and materials for TW instructors
- test efficacy of DDL units in different teaching environments



THANK YOU

NSF (#1708360/#1708362)

University of Florida for sponsoring the UF Corpus Linguistics Lab

University of North Texas for internal funding to the Technical Writing Project

Chad Hammock for his help with coding data

The conference organizers

You!

swulff@ufl.edu

ryan.boettger@unt.edu

Our slides are available at www.technicalwritingproject.com

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