

## How to Write More Efficiently

EM Stone

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Perhaps the most important concept is to find a way to look forward to a chunk of writing instead of dreading a chunk of writing. This is an opportunity to . . . what? Answer that question. Believe it. And start there.

In some cases, starting with a summary might be a good idea. What did you just tell them (in your imagination)? Then make that true, in stages. The IVR Manuscript Questionnaire (see below) will help you with this.

Everyone has a time of day that they are most energetic and creative. Find it and use it. To do so maximally, one must also take steps to reduce distractions. Turn off the email annunciator. Turn off the cell phone. Let the landline roll to the project assistant or the answering machine. Work in an uncluttered place so that the clutter is not calling you constantly to do something about it. Working in the morning gets you as far away as possible from the frustrations, problems, and fatigue of the previous day and those of the present day. Don't let your co-workers meet you at the door with some type of grumbling, ugly, recurrent problem. They can meet you with exciting good news (this will energize you) but hitting you with insoluble problems before you have typed a keystroke or written your first creative idea on a sheet of paper is a bad pattern to get into. Get a cup of coffee and something to eat before you start. Get the computer, pencils, brown book, outlines, dictaphone, papers, etc. together before you start. If you don't work well in a completely empty office, figure out a strategy for rounding up some non-distracting company (e.g., coffee shop).

Work in defined blocks of time. 45 minutes of solid work, 5 minutes off for a coffee refill and a trip to the bathroom and then 45 more minutes. Try to plan the 45 minute spans and stick to the plan. Keep records of how much you can write/dictate/type/edit per 45 minute block so that you can set achievable objectives for yourself -- then achieve them. For example, the first 300 words of

this page took about 30 minutes for me to write. So, if I needed to create a 2000 word draft from a fairly well formed set of ideas, I would need to budget five of my 45 minute work blocks to get it done. Of course you shouldn't quit right at the 45 minute point if you are on some type of roll, but you should resist quitting early if you complete a topic/page/paragraph/idea before the allotted time. A good use of a little scrap of time at the end of a 45 minute block is to PLAN the work of the next 45 minutes so that you can hit the ground running when you get back.

When working at home (and/or on the weekend, and/or after 5PM) it can be difficult to find a 45 minute block to work without missing a priceless family opportunity (which you absolutely should not miss). Remember, the dean isn't coming home for Christmas 20 years from now. Your children are. Anyway, at home, you may need to work in smaller segments. Here are the rules for doing so.

Estimate the segment length as you begin so that you can focus on the appropriate goal. If you create 10 words per minute in your 45 minute blocks, you aren't going to suddenly start creating 25 words per minute in your 20 minute blocks. Most importantly, don't get into the habit of using smaller blocks when a little planning would have allowed larger blocks (i.e., at work from 8-5). Smaller blocks will never be as good as a good 45 minute block early in the morning before someone has dumped a sack of fecal material on your keyboard. Never intentionally give up one of those priceless 45 minute morning blocks for some routine thing that could have been done just as well later in the day when you are a little more tired and when the negative effects of the outside world have gotten all over you. In fact, it would be better if your big blocks could be even larger -- say 50 minutes or an hour. But think back to college, the difference between classes that met three times per week for 50 minutes and those that met twice a week for 75 minutes. The latter were BRUTAL. Who could be interested in a topic for that long? So, everyone probably has a different "maximum big block length" based upon their wiring, but one should work in big block lengths whenever possible.

Work from an outline or some type of plan (e.g., IVR Manuscript Questionnaire; and, Model Paper Scorecard -- both below) so that the number of dog house roofs will match the number of dog house walls at the end of the day (unless of course some one ELSE is off working on the walls which again requires some type of planning and communication to know and take full advantage of).

Working from an outline or a clear plan, on a topic I am very familiar with, I can often write 600 polished words per hour.

In "draft mode" one should not worry very much (if at all) about the transitions between sentences of paragraphs. Just get the sentences down -- you can edit them later. Similarly, if you cannot think of the best word or phrase for a given situation, just take a stab at it and put the concept in brackets [like this] to indicate that you are not totally happy with these words but want to move on to finish the thought. If an idea suddenly pops into your head that is totally out of context of the little piece you are working on, go ahead and type the idea quickly using braces {like this} to indicate this momentary shift of focus -- you can move the idea somewhere else later. The key is to keep some sort of momentum going.

Keep spanner-wielding distractors out of the saw room. This is easier said than done as one becomes more senior and more in demand. Note how being "in demand" sounds great if one is a performer, artist or cook. Being "in demand" as a doctor or scientist when the number of demanders exceeds the number of demandees and when the demanders bring little if any resources with them to help execute the demands puts a different perspective on this term (witness protection program).

Transistor analogy. In a transistor, a small flow of current from the emitter to the base catalyzes a larger flow of current from the base to the collector. Sometimes writing little ideas in braces or summarizing a relevant paper or even digitizing family photos on the scanner on the desk can serve as this emitter to base stimulatory current. The key is to stay at the desk with keys being hit so that SOME useful words are accruing toward the goal of the 2000-3000-4000 words

needed to complete the current writing project.

Although it is tempting -- and sometimes desirable -- to stay very focused on one topic at hand and just grind out 450 word segments in 45 minute increments, one usually pays an "interest" price for doing so. That is, you get bored with the topic and it shows in the quality and the quantity of the writing. The analogy is working in a workshop on a project with a bunch of similar parts (like shelves in a bookcase). There are 32 shelves. Each one has two sides and 4 edges that need three coats of varnish with sanding in between. BOR-ING. You can do a few of them at a time and it is not too bad (because the sense of progress toward the larger goal carries you past the boredom). But to just grind away for hours and hours converts a "fun" hobby into a miserable task. So, do a few shelves (one or two 45 minute blocks) and then move on to some other project that is fresh (at least fresh for that day). Again, planning is required to make this "project switching" work out well in the end. Without planning, you just have 50 unfinished projects and that is much worse than boredom as an inhibitor of creativity and progress. So, to restate, there is a balance between focus (persistence) and topic diversification that will keep productivity high without sacrificing creativity and enjoyment. These are all important instruments on your dashboard and you should look at them frequently to keep them all in the green zone.

Having said that, most people cannot serve as an effective "leader" for more than two or three writing tasks at a time. So, you should keep an continuously updated list of the manuscripts that you want to lead the writing of, prioritize these projects, and work hard to complete the top one or two before moving on to the next. If you hit some type of immovable roadblock on a writing project (e.g., you won't have some key data in hand for weeks) consciously pause that project and move something else into the number 1 spot.

Something to train yourself to do without fail is to save versions of your work frequently to minimize the chance of loss from technical glitches (and to allow you to go back to something that was better when you wander off into the weeds).

The IVR has developed two tools for jump-starting and sustaining a writing effort in the face of the many other pressures academicians face every day. The first is a simple questionnaire (below) that allows a writer to get beyond the “blank sheet of paper” stage quickly. The second is the concept of using a similar paper (from the target journal) as a model for a new paper for three purposes: 1) to get the writing into the proper form and length from the beginning; 2) to allow the writer to break the task of writing the paper down into smaller exceptionally well defined parts; and 3) to create a “report card” for judging the completeness of each of these parts as follows:

A-very good

B-OK

C-exists but needs work

D-outlined or component figures/images exist

F-does not exist

For example, if one wanted to submit a paper to PNAS with findings similar to our discovery of the MAK gene as a cause for human retinitis pigmentosa (Tucker, et al., *Proceedings of the National Academy of Sciences of the United States of America*. 2011;108(34);569-576), one could “analyze” the structure of that paper as follows:

Title: 20 words. 134 characters

Authors: 9

Abstract: unstructured, 250 words

Introduction: 444 words, three paragraphs, 16 sentences (27.75 words per sentence) as follows:

- 1) five sentences, 111 words: cilia, RP, RP genes x2, ARRP inheritance
- 2) five sentences, 151 words: exome, exome sequencing, limitations of the latter, overcoming limitations x 2
- 3) six sentences, 182 words: personalized genomic medicine, better databases and methods needed, finding more people, iPSCs, “in this study” we x2

Results: 2353 words, 9 sections (260 words per section average), each beginning with a sentence that describes what is in the section as follows.

- 1) 721 words - Next-generation sequencing detects an Alu insertion in *MAK*.
- 2) 259 words - The Alu insertion in *MAK* causes retinitis pigmentosa in individuals of Jewish ancestry.
- 3) 191 words - The Alu insertion in *MAK* is not associated with other photoreceptor degenerations.
- 4) 123 words - *MAK* is expressed in both rod and cone photoreceptors in the human retina.
- 5) 233 words - Patient derived induced pluripotent stem cells (iPSCs) exhibit retinal specific markers after *in vitro* differentiation.
- 6) 184 words - The Alu insertion in exon 9 results in loss of the retina specific isoform of *MAK*.
- 7) 356 words - The retinal isoform of *MAK* contains a novel human exon.
- 8) 102 words - Inclusion of exon 12 requires the inclusion of exon 9.
- 9) 184 words - Point mutations in exon 9 and exon 12 are not a common cause of RP.

Discussion: 1190 words, 7 paragraphs (average 170 words per paragraph)

- 1) What is known about *MAK*'s function
- 2) Summary of the evidence that *MAK* causes RP
- 3) RP and why studying rare diseases is important
- 4) Gaps in our current methods of disease gene discovery
- 5) Gaps in current exome methods
- 6) Advantage of iPSC for this kind of thing
- 7) In summary, we found and this means (two sentences, at total of 86 words)

Methods: 1218 words, 13 sections

Human Subjects: All subjects provided written informed consent for this research study, which was approved by the Institutional Review Boards of the participating centers and adhered to the tenets set forth in the Declaration of Helsinki.

DNA Extraction

Exon Capture

Next-Generation DNA Sequencing

Single Strand Conformation Polymorphism Analysis PCR

Single Strand Conformation Polymorphism Analysis

Automated DNA Sequencing

Immunohistochemistry

iPSC generation

iPS cell differentiation

Immunoblotting

RNA isolation and RT-PCR

Northern Blotting

9 Figures

2 Supplemental Figures

9 figure Legends

2 Supplemental Figure Legends

27 references

an outline from a series of questions]

One would then use this analysis to create a scoresheet or “report card” (see next page) for the individual tasks needed to create the new paper, as follows. As each section is worked on, the section’s grade changes from “F” to something better. Now, the writer’s task becomes very achievable, e.g., “I will complete the “overview questionnaire with my colleagues over lunch today” or “I will write two of the 100 word methods sections in the next 45 minutes”, or “I will polish the current version of the abstract from ‘OK’ to ‘ready to submit’”.

PNAS Model Scoresheet

[paper nickname here]

[paper leader here]

F Overview questionnaire

F Title: 20 words. 134 characters

F Authors: 9

F Abstract: unstructured, 250 words

F Introduction: 450 words, three paragraphs, 15 sentences (30 words per sentence) as follows:

F 1) five sentences,

F 2) five sentences,

F 3) five sentences,

F Results: 2353 words, 9 sections, 9 descriptive sentences

F 1) 260 words – descriptive sentence

F 2) 260 words – descriptive sentence

F 3) 260 words – descriptive sentence

F 4) 260 words – descriptive sentence

F 5) 260 words – descriptive sentence

F 6) 260 words – descriptive sentence

F 7) 260 words – descriptive sentence

F 8) 260 words – descriptive sentence

F 9) 260 words – descriptive sentence

Discussion: 1190 words, 7 paragraphs (average 170 words per paragraph)

F 1) 170 words – topic(s)

F 2) 170 words – topic(s)

F 3) 170 words – topic(s)

F 4) 170 words – topic(s)

F 5) 170 words – topic(s)

F 6) 170 words – topic(s)

F 7) In summary, we found and this means (two sentences, at total of 86 words)

Methods: 1300 words, 13 sections, 100 words each

A Human Subjects: All subjects provided written informed consent for this research study, which was approved by the Institutional Review Boards of the participating centers and adhered to the tenets set forth in the Declaration of Helsinki.

F 2 Method

F 3 Method

F 4 Method

F 5 Method

F 6 Method

F 7 Method

F 8 Method

F 9 Method

F 9 Figures

F 2 Supplemental Figures

F 9 figure Legends

F 2 Supplemental Figure Legends

F 27 references

## IVR Manuscript Questionnaire

[paper nickname here]

[writing group here]

[paper leader here]

**Create an outline for the paper by answering the following questions.**

1) *What is the paper about in general?*

2) *Try to write a descriptive title (you can change it later) – imagine that this title is in a list of 15 other papers, try to put something in the title that would entice someone to want to read THIS PAPER among all of the other ones on the list.*

3) *Give at least 5 reasons that you did the experiments you will describe in this paper. The reasons in this section are more to say what the problem is and why the problem is important while the reasons given in the discussion are more to say why the results are important and how the results are related to other literature.*

4) *List the experiments in logical order and what they showed.*

*VERY IMPORTANT – it is often the case that one is not sure initially how much or how little should be included in a given paper. Do not let this distract you or slow you down. Just divide the work into sections (like aims in a grant) and start writing. You can evaluate different combinations of these “aims” after you have something solid to work with.*

5) *List possible figures with a brief description of what they will show (i.e., draft the captions).*

6) *List 5 reasons that these results are important.*

7) *List at least three other things in the literature that tie in with these results.*

8) *List three things you can do now that you have these results.*

9) *List the methods that were used.*

10) *Ideas for possible expansion of the paper*

11) *List three journals to which you could submit this paper in your order of preference.*

12) *Choose a model paper for the first journal on the list and use it to create a "writing progress score sheet" with A-F grades for each element.*