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Equidistant Letter Sequences in Tolstoy's "War and Peace"

Abstract

In [WRR2], Witztum, Rips and Rosenberg found a surprising correlation between famous rabbis and their dates of birth and death, as they appear as equidistant letter sequences in the Book of Genesis. We make a smaller or equal number of mistakes, and find the same phenomenon in Tolstoy's eternal creation "War and Peace".

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1. Introduction

Our inspiration comes from reading the paper [WRR2] by Witztum, Rips and Rosenberg (WRR). The outline of the story in [WRR2] is as follows:

- WRR (along with Prof. S.Z. Havlin) prepared a list of very famous rabbis and a list of dates that pertain to these rabbis, and found that equidistant letter sequences (ELSs) for certain appellations for these rabbis appear relatively near to ELSs for their corresponding dates in the Book of Genesis. To make their research completely objective, they chose the appellations and dates using a rigid procedure that leaves little or no choice. They specified all selection, identification and spelling rules in their paper [WRR2]. (We note that in [Hav], written more recently, Havlin acknowledges making many mistakes in preparing the list and says that if he were to do it again, he would have done it differently. Some further comments on the inconsistency and absolute arbitrariness of the WRR-Havlin list and on [Hav] were made by Prof. Menachem Cohen of the Department of Bible in Bar-Ilan University. See [Co1]).
- Just to be sure, a referee who read an early draft of [WRR2] asked that a second list of famous rabbis (and corresponding dates) be made, using exactly the same procedure. WRR did just so (again with

help from Prof. Havlin), and noticed the same unlikely proximity of ELSs for appellations and for dates, using the same method of study as in the case of the first sample of rabbis.

- A statistical study of the proximities for the second sample of rabbis gave a significance level of $4/10^6$ (using their "P_4-score"). There is no way WRR (or Prof. Havlin) could have produced these results by fine tuning the choices of names and spellings, as these choices were made following rigid procedures that were established and refereed before a referee suggested making the second list. So, believing all that, we are forced to conclude that something truly unusual is going on in the Book of Genesis.

The purpose of this note is to show that WRR-Havlin still had some choice in applying their "rigid" procedures - enough choice to generate comparable significance levels in War and Peace. We do this by purposefully constructing our own list of appellations, staying within the WRR-stated rules or breaking them by about as much as they did. If one can find a list of appellations that works well on War and Peace (and pretty badly on Genesis), the only remaining reason to believe WRR-Havlin is personal trust in the cleanliness of the procedures they used to determine the list of appellations (and the other aspects of their experiment). While many beliefs are founded on trust bestowed on a very small group of prophets or apostles, such beliefs are often false, contradictory or absurd, and are definitely outside what one would normally call "science".

1.1. Acknowledgement

We wish to thank Maya Bar-Hillel, Menachem Cohen, Alec Gindis, Gil Kalai, Elchanan Reiner, Shlomo Sternberg, and the others who helped, for their suggestions and support.

2. Their choices, our choices

In [WRR2], WRR write:

> The list of appellations for each personality was provided by Professor S.Z. Havlin, of the Department of Bibliography and Librarianship at Bar Ilan University, on the basis of a computer search of the "Responsa" database at that university.

Contrary to what is suggested by the above quote, many of the appellations WRR use do not even appear in the Bar-Ilan Responsa database [Re]. Thus in addition to the Responsa database [Re] we will also refer to the Margalioth Encyclopedia [Marg], used by WRR to select the rabbis, and to the highly-regarded Encyclopedia Hebraica [Heb] used by WRR in several of their other investigations. We (like WRR) also use other sources as needed.

2.1. Modifications to specific appellations

1. The word המלאך (the angel) is a noun (sometimes used as an adjective), and is not really an appellation. Since it is a common noun, the word המלאך by itself, does not uniquely identify Rabbi II-3 (the third Rabbi in WRR's second list of personalities), Rabbi Avraham HaMalach. It is inconsistent to use this as an appellation for Rabbi Avraham, while at the same time not to use החסיד (the Hasid, the pious) for Rabbi I-11 (the eleventh Rabbi in WRR's first list), Rabbi Yehuda HaHasid (the word החסיד at least always refers to a human...). We also note that when we turned to an independent expert to form a completely a-priori list of appellations for the Rabbis in question (see details in [MBBK]), he used the combination רבי אברהם המלאך, but not the adjective המלאך on its own. Thus we remove the appellation המלאך.

2. Rabi II-6, Rabbi Eliezer Ashkenazi, is sometime called after his book titled "מעשי ה'". Thus we inserted the widely used appellations מעשי ה' and בעל מעשי ה'.

3. We add the acronyms המהרח"א and מהרח"א (Rabbi II-10, Rabbi Haim Abulafia). The last acronym appears very often in the Bar-Ilan Responsa Database [Re], it is used in [Az], and its omission in [WRR2] is especially questionable. In [Hav], Prof. Havlin explains the omission of המהרח"א and מהרח"א by asserting that they are also used in relation with other Rabbis. But in other places, Havlin does use appellations that refer to more than one Rabbi. A good example is הראב"ד, which appears in Havlin's lists both as an appellation of Rabbi I-1, Rabbi Avraham, The Ra'avad of Posquieres, and for Rabbi II-1, Rabbi Avraham, Av-Beit-Din of Narbonne. We allow ourselves a similar leeway.

4. In [Hav], Prof. Havlin described the methodology he employed in producing the list of appellations. In his report he acknowledged a few omissions he made in the original list. One of those omissions is the appellation הרב חבי"ב for Rabbi II-11, Rabbi Haim Benvenist(e). Thus we have added הרב חבי"ב to our list, with and without the definite article ה. We have also added the widely used הרב החבי"ב.

5. The appellations בנבנשת and בנבנשתי are both used for Rabbi II-11, Rabbi Haim Benvenist(e). WRR chose בנבנשת, we choose בנבנשתי. Incidentally, בנבנשתי appears in Responsa more than בנבנשת, as a surname of this rabbi in a ratio of between 2:1 to 3:1. The appellation בנבנשתי also appears in the heading of this rabbi's entries in [Vin, Hala, Halp, St, Ei], and in other places.

6. The last name of Rabbi II-12, Rabbi Haim Capusi, can be spelled either כפוסי or כאפוסי. In Responsa, they appear in an 8:3 ratio, which indicates quite clearly that both spellings are valid. See also the title of this rabbi's entry in [Ei]. WRR state explicitly in [WRR2] that in such cases they use both spellings. But in their list they took only the first form. For our list, we make the opposite mistake and take only the second form.

7. There is no doubt that the two forms בעל נס and בעל הנס are most often associated with Rabbi Meir, whose grave is near Tiberias, rather than with Rabbi II-12, Rabbi Haim Capusi. The vast majority of references to בעל הנס in Responsa refer to Rabbi Meir and not to Rabbi Haim Capusi. In particular, in the Responsa of the Chatam Sofer, (Part 6, Likutim, Article 27), we find that the formula "for the soul of בעל הנס" (without the proper name Rabbi Meir!) was used for contributing charity for the soul of rabbi Meir Baal Hanes, and not for the soul of Rabbi Haim Capusi. We note that on several occasions Havlin ruled out an appellation for a certain personality because it was more closely associated with some other personality (see [Hav]). Hence we remove the appellations בעל נס and בעל הנס.

8. Rabbi II-15 is Rabbi Yehuda Hasid Segal. WRR omitted the appellation יהודה סג"ל, his full name. For example it can be found in [Be, pp. 141, 143-144]. Notice that in the similar case of Rabbi II-23, HaMaharil, who was also called Yaacov Segal WRR did use the full name יעקב סג"ל. Following that precedent we add יהודה סג"ל to our list. We also use the appellation הר"י חסיד, a parallel of the appellations הר"י עמדן and הר"י עמדין used by [WRR2] for Rabbi II-24, the Yaabez. This appellation can be found in this rabbi's entry in [FR]. There are no appearances of these two appellations (for this rabbi) in the Responsa database, but then according to Prof. Havlin's this rabbi is one of the rabbis who are expected to appear only rarely in the Responsa. See [Hav].

9. The last name of Rabbi II-16, Rabbi Yehudah Ayash, can be written as עיאש or עאיאש. The independent expert mentioned above used for the a-priori experiment the forms עייאש and עאייאש, but for our "experiment" here we follow the "grammatical" dictum that Wiztum has set in the case of Oppenheim, i.e. that we must not use a "double yud" in transliterating foreign names, so we write עיאש and עאיאש. The ratio of appearances of עייאש vs. עאייאש in the Responsa is about 800:1. However from the example of the name Caro for Rabbi I-19, we can see that WRR thought that, according to their "mater-lectionis" rule, both the forms (i.e. with and without aleph) should be included even when

the ratio between them in the Responsa in 2000:0 (that seems to be the ratio between the last names קארו and קרו in the Responsa). Therefore, we add the appellation עאיאש for Rabbi II-16, Rabbi Yehudah Ayash.

10. We add the appellation הר"י טראני to Rabbi II-19, The Maharit, along with the variations טרני, ר"י טרני, הר"י, and ר"י טראני. This puts the Maharit in a similar status with the Yaabez (see below).

11. The last name of Rabbi II-22, Rabbi Israel Yaakov Hagiz, can be spelled either חגיז (as in [Heb] and as in the biographical section of [Re]) or חאגיז (as in [Marg]). But WRR use only חאגיז, contrary to their explicit convention that where א is used as a "mater lectionis", they take both forms. Thus they fail to use the appellations מהר"י חגיז and ר"י חגיז (both appear in Responsa). We allow ourselves to make the opposite mistake, taking the appellations מהר"י חגיז and ר"י חגיז and omitting חאגיז. We note that even though the WRR computations are restricted to appellations totaling 5-8 letters, we can tell which 'short' appellations (such as חגיז, עמדן, or מולן) they consider as valid either by checking whether they have used longer appellations that contain the shorter ones as substrings or by reading their "blue preprint" [WRR1], in which the short forms are also listed.

12. In the case of Rabbi II-24, the Yaabez, we do not use appellations based on the spelling עמדן for two reasons. They appear less often, and we wish to follow the precedent set by WRR when they did not use the form מולן with Rabbi II-23, the Maharil. (The appellations יעקב מולן, מהר"י מולן, etc., appear often in Responsa, more often than forms with עמדן, and were omitted in [WRR2]. See also [WRR1]).

    We note that there may be a case for removing the name עמדין altogether, for it is just the name of a town were the Yaabez was briefly a Rabbi, and not his last name. The Yaabez himself wrote in [Ya],

    הטרוד יעקב ישראל מכונה יעב"ץ ס"ט לא נקרא מעולם יעקב עמדין...
    (כאשר עשה מכ"ת אדרעס ע"ג האגרת כמו שהרגיל התועב שר"י בפי
    הבריות) ידוע שאינני מבני עמדין לא נולד בה ולא מצפה לראות' אך
    מבקש טובת' ותועלת' כמאז ומקדם בהיותי רובץ תחת משאה, ככה עתה
    אני שוקד על תקנת'...

    In free translation to English, this reads:

    > ... The busy Yaakov Israel known as Yaabez good omen was never called Yaakov Emdyn (עמדין) (as has done the honourable in the address on this letter as is the deplorable habit in the tongues of the people). It is known I am not from the people of Emdyn, was not born there, do not expect to see it, but am looking after its welfare and benefit as in the former times when I was under it's load, [and] so also am I now diligent for it's remedy. ...

    Little did his plea help, and the Yaabez has several common appellations which are variants of the word עמדין. We keep them in our list. However, we can learn from this example that WRR didn't mind using names that were not used (or were even rejected) by their bearers. This lesson will become relevant in the case of Rabbi Shlomo Chelma below.

13. WRR are inconsistent about the use of the definite article, ה. For example, they use הר"י עמדן and הר"י עמדין for Rabbi II-24, but omit ר"י עמדן and ר"י עמדין. (The latter two forms appear in Responsa more often than the former two!) We fix this mistake in our list.

14. The last name of Rabbi II-25, Rabbi Yitshak HaLevi Horowitz, is spelled הורוביץ at the title of his entries in [Marg], [Heb], and in [Halp]. We thus replace הורוויץ by הורוביץ.

15. The Krochmal Story: We suspected that the spelling קרוכמל for the last name of Rabbi II-26, Rabbi Menachem Mendel Krochmal, author of the responsa book צמח צדק and of the biblical commentary פי צדיק, was not the original spelling. So we started searching. The word קרוכמל does not appear in the Bar-Ilan Responsa database [Re]. The only variation of קרוכמל that does appear there is קראכמאל, which appears only twice. But in both appearances it is the Yiddish word for starch, and not a Jewish surname. In [Marg], קרוכמל is in the header of Rabbi Menachem Mendel's entry, but no explanation for the origin of the name is given. In [Heb] Menachem Mendel doesn't even have an entry, though the index mentions him twice. Looking inside the text, we found the spelling קרוכמל, but no further clues as for the original spelling. His books are signed מנחם מענדל and מנחם מענדיל, and no קרוכמל is mentioned in them in any form. An eulogy for him [Shm] mentions only his first name(s), מנחם מענדיל, and the titles of his books. So where did "קרוכמל" come from? [Az] was of no help. In the 19th century bibliography [B-Y] one of Krochmal's books is listed under קראכמעל. In a 19th century biography [Du] of David Oppenheim, Krochmal is mentioned in passing, and his name is given as קראכמאל. We are almost certain we also saw קרוכמאל and קרוכמעל, but after a long day in the Israeli National Library in Giv'at-Ram, the stairs leading to the photocopy machines seem very steep and the pencil becomes really heavy, so we don't have references for these two forms. The 19th century Rabbi Nahman Krochmal spells his own name קראחמאל, while in modern sources his name is spelled both as קרוכמל and קרוכמאל. All of that taken together indicates clearly that Krochmal was not spelled "קרוכמל" in the 19th century, but it doesn't help us find how Krochmal was spelled when Rabbi Menachem Mendel lived, in the first part of the 17th century.

    At this point we got the advice of two wise men. One suggested that we look at [Hei], a book on the Jewish laws in the state of Moravia, where Rabbi Menachem Mendel was the state's Rabbi. From the other wise man we learned to check the citations in the footnotes. One footnote, on page 111 of [Hei], he checked himself. It lead to an article [Marx], that contains a letter written by the son of a nephew of Rabbi Menachem Mendel in the late 17th century, only a few dozen years after Rabbi Menachem Mendel died in 1661. In that letter Rabbi Menachem Mendel's surname is given as קראחמאל. The following day (and a continent away), we checked the footnote on page 102. It lead us to two articles, [Hor] and [Ka], devoted to our Rabbi and his descendents. Both articles use the spelling קראכמאל extensively and not just in passing, and the latter one even explains where the name comes from! It relates the name קראכמאל to a certain Dayan, Rabbi Jonah Krochmals in the city of Cracow, where Rabbi Menachem Mendel was born. A transcript of the tombstone of Rabbi Jonah Krochmals is given in [Zu, page 180] and Krochmals is spelled קראכמאלש there. Thus there is no doubt that the original spelling of the name Krochmal is קראכמאל and thus it is fully justified to remove the appellation קרוכמל from the list, an to put קראכמאל instead.

    We also note that once it is clear that קראכמאל is an acceptable spelling for Krochmal, the usage of this spelling is mandatory according to the WRR rules, which state explicitly that Yiddish names are spelled as in the original Yiddish. Recall that קראכמאל is a the Yiddish word for starch, and from [Ka] we learn that the first people to be called by the family name Krochmal were called so because they traded in starch.

    However, in his "refutation" of a draft version of this article, Witztum argued against the use of the appellation קראכמאל. We completely disagreed with his argument, but were amused to note that Witztum himself gives a reference for a source that uses the form קרוכמאל. If, as Witztum indicates, קרוכמאל is a valid form, then it must have been used along with קרוכמל, by Witztum's own "mater-lectionis" rule. Thus we may feel free to use either קראכמאל or קרוכמאל instead of קרוכמל. This time we chose קרוכמאל.

16. The primary variant of the last name of Rabbi II-27, Rabbi Moshe Zacut, is זכות, and not זכותא or זכותו. See his own signatures in his book קול הרמ"ז, see the Hebrew title of his biography [Ap], and see [Marg, Heb, Az, Ei, Halp, St, Hala]. Hence we remove the appellations משה זכותא, זכותו, זכותא, and

משה זכותו.

At the same time we note that WRR's use of variants like זכותא and זכותו sets a precedent which we are allowed to follow elsewhere. Hence for Rabbi II-28, Rabbi Moshe Margalith, we add the variant מרגליות of his last name. This variant appears in the titles of his entries in [Az, Vin, St, Ju, Fri], in the entry for his book in [B-Y] (p. 487) and also in the index of [Marg].

17. The story of "Hon-Ashir" and "Yosher-Levav": Often great rabbis are called after their books. In section C of the chapter "Professional Judgment" in Prof. Havlin's report [Hav], it is explained that when we can find that a rabbi is called "the author of (the book) X" in a context where another of his works is discussed then we can regard it as an appellation of him. But, if we can find "the author of (the book) X" only in a context where the book X is discussed then we can regard it as nothing more than a shorthand way of referring to the content of the book itself (that is "the author of Such-and-Such says.." or "HaRav Such-and-Such says..", rather than saying "it is written in the book Such-and-Such.."). Now, ישר לבב is a name of one of several books published by Rabbi II-30, Rabbi Immanuel Hai Ricchi, and not the most important of them. To check whether it deserves to be regarded as this rabbi's appellation, we searched both the [Re] and [DBS] CD-ROMs. The second CD-ROM contains a collection of books on Cabala and Chassidic literature, the fields in which this rabbi is most likely to be cited. Yet, we found no appearance of "the author of (the book) ישר לבב" (or "the author of (the book) יושר לבב") that is not in the context of discussing this book. On the other hand, we did find the following sentence: "the holy genius author of Mishnat Hasidim o.b.m. wanted to understand the secret of Tsimtsum. (see his book יושר לבב)...". Within [DBS], see "Mavo Lechochmat HaKabala" part 1, gate 3, chapter 1. We see here that even when the book ישר לבב is being discussed this rabbi is called after his most important book Mishnat Hasidim. Therefore, according to the rule we mentioned above (from Havlin's report) we conclude that ישר לבב is not an appellation of this rabbi and we remove it. On the other hand we did find in the Responsa the following sentence (concerning the same rabbi): "the Rav Hon-Ashir in the book Aderet-Elyahu has said..". (See responsa "Peulat-Tsadik" part 3 section 184). Here we see that this rabbi is called after the book "Hon-Ashir", even when another of his books is being discussed. So we conclude (using the same rules in Havlin's report) that the name of the book הון עשיר should be considered as an appellation of this rabbi, and we add it.

18. The story of the appellation א"ח הע"ר of Rabbi II-30, Rabbi Immanuel Hai Ricchi, is particularly telling. First, we couldn't find it anywhere, and nobody we asked could tell us what it meant. When we inquired with Doron Witztum, he said Rabbi Ricchi used it as his signature in some of his books, and that it expands to "אני חי, הצעיר עמנואל ריקי". After some more investigations we have found that in fact (as far as we could determine) it appears only once as a signature in a printed addendum, that survived only in 1 or 2 copies (that we know of), of Rabbi Ricchi's book "מעשה חושב". This signature is also mentioned in the bibliographical article [Shi] that describes one of these copies (the one in Zurich), and this article is also where the explanation "אני חי, הצעיר עמנואל ריקי" comes from. We think the inclusion of this acronym is extremely wrong. First, it is a very rare signature; not an appellation. Indeed, it seems that nobody refers to Rabbi Ricchi by this name, for we could find no such references and we could hardly find anyone who even knows what it means! Second, it is in fact only a part of a signature. Anyone looking at the article [Shi] can see that the signature that actually appears there is אחהער רפה! Third, it is not "pronounced" (נהגה), while WRR claim to use only pronounced appellations. Here we have to say that Wiztum's speculation that it should be pronounced "Ach-HaEr" is highly original, but not convincing at all. First, he gives no source for this suggestion. Second, as we said, the signature actually appears as אחהער רפה. That is, the first part of it אחהער appears as one word, and not as 2 words - א"ח הע"ר - the way Wiztum writes it, and the way one would expect if it was intended to be pronounced "Ach-HaEr".

More than that, one expert we consulted said that there is a possibility that even this single appearance is no more than a typo in the original addendum. The reason for this suggestion is that a different permutation of these letters, אהעח"ר רפה, appears with its expansion, אני הצעיר עמנואל חי ריקי (me the young, Immanuel Hai Ricchi), and an explanation of the רפה part, several times in several of this rabbi's books. We note that in Hebrew the latter expansion makes much more sense than the former, since the former taken literally means "I'm alive, the young Immanuel Ricchi". Indeed, the acronym אהעח"ר is listed in the dictionary of acronyms [AY], while א"ח הע"ר is not. (By the way, since אהעח"ר רפה is also a non-pronounced signature it may be considered wrong to include it as well, if one wishes to take WRR's commitment to pronounced appellations more seriously than they did.) Be that as it may, the reasons brought before are more than enough to show clearly that including א"ח הע"ר is extremely wrong. We remove it.

On the other hand, we found two other signatures (or self-references) used by this rabbi, that unlike אהעח"ר רפה and אחהע"ר רפה, are definitely pronounced, and therefore we add them. These are: העשי"ר - appears in [Ri1] page 4. It is a permuted acronym of הצעיר ששמי עמנואל ריקי יצ"ו, and also serves as a word-play on the name of the book "Hon-Ashir". אוהב ור"ע - appears in [Ri2] - part 2, page 53b. means "loving friend" and also is an acronym of "Ricchi Immanuel".

19. The entries of Rabbi II-31, Rabbi Shalom Sharabi, in [Heb] and [Marg] and in the sources [Az], and [Re] never refer to him as שר שלום, and we found at least 7 other rabbis that carry the name שר שלום (and that are referred to by this name extensively). One of these rabbis, Rabbi Sar-Shalom Gaon, is a "Rishon". We note that in similar situations WRR have removed this kind of "shared" appellations; see [Hav]. We follow suit in this case. We should also add that even if this appellation was not a shared one there was another case for removing it. The appellation שר שלום is not R. Shalom Shar'abi's given name, nor is it his last name. It is only a poetic epithet (meaning "Prince of Peace") which was conferred upon him by other scholars throughout the generations. We can see that WRR didn't always use this kind of epithets. For example they didn't use פרשן דתא for Rashi, הרב המשביר for R. Yosef Caro, and ר"ם במז"ל(ה) and הרב המורה for Rambam. Thus we are allowed to follow suit and omit שר שלום.

20. The appellation מזרחי for Rabbi II-31 is related to him just like the name אשכנזי relates to Rabbi I-6, Rabbi Gershon Ashkenazi and to Rabbi II-6, Rabbi Eliezer Ashkenazi. In both those cases WRR did not use the appellation אשכנזי. Thus, it is inconsistent to use מזרחי, and we remove it.

21. The appellations מהרש"ש and המהרש"ש for Rabbi II-31 are only variants of the more well-known appellation הרש"ש. In the Responsa and DBS CD-ROMs the variant הרש"ש appears more often than מהרש"ש and המהרש"ש. In Responsa the ratio for this rabbi is about 256:6. In the famous book "Ben-Ish-Hay" which was much influenced by Rabbi II-31 (and which appears in the DBS CD-ROM) he is mentioned 72 times as הרש"ש but never as מהרש"ש or המהרש"ש. See also the titles of this rabbi's entries in [Heb] and [Marg]. In Havlin's report section F, Havlin says that when there are two close variants of an appellation like מהרש"ל vs. הרש"ל, he used only the one more frequently used. For comparison the ratio between מהרש"ל and הרש"ל in the Responsa is only about 3:1. Therefore we can clearly see that by this rule it was wrong to include מהרש"ש and המהרש"ש and accordingly we remove them. (It would have been right to include the appellation הרש"ש, only that it is shorter than 5 letters, and hence automatically excluded by the rules of [WRR2]).

22. The last name of Rabbi II-32, Rabbi Shelomo Chelma, can be spelled either as חלמא or as חעלמא. This name appear at the header to his entry in [Heb], in his biography [Br], in the titles and prefaces of Chelma's books שו"ת לב שלמה (Mossad HaRav Kook, 1972), מרכבת המשנה על התורה (Mossad HaRav Kook, 1975) and שולחן ערוך (על שו"ע אה"ע) (Machon Yerushalayim, 1988). This name also appears a few times in the Responsa database and in the 19th century bibliographical work [B-Y] (p. 373 entry 2295).

Thus we wish to add the appellations חלמא, חעלמא, שלמה חלמא, and שלמה חעלמא. In practice we only add חעלמא and שלמה חלמא, for the other two appellations do not fit within 5-8 letters. We will add that it appears that this Rabbi didn't use these names himself, but was only called so by others, however as WRR's precedent with the name Emdin (that was mentioned above) shows, this needn't make any difference, and these names can be included.

2.2. Modifications to the list of personalities

We make the following additional changes to the list produced by WRR:

- We add to our list a new Rabbi, Rabbi Meir Eisenstadt. His entry in [Marg] has exactly 1.5 columns (with the header included it is even longer than 1.5 columns), and by the criteria of [WRR2], he should have been included. His common appellations are רבי מאיר, איזנשטט, איזנשטאט, and מהר"ם א"ש. His date of death is the 27th of Sivan, written in the forms כ"ז סיון, בכ"ז סיון, and כ"ז בסיון.

- We remove Rabbi II-20, Rabbi Yosef Teomim. His entry in [Marg] has less than 1.5 columns, contrary to the selection criteria of [WRR2]. When the header of his entry is counted too, the entry reaches precisely 1.5 columns. Even so, the exclusion of Rabbi Yosef Teomim by us is certainly more justified than the exclusion of Rabbi Meir Eisenstadt by WRR.

- We remove Rabbi II-4, Rabbi Avraham Saba and Rabbi II-8, Rabbi David Ha-Nagid. Both rabbis have no dates attached. Keeping them means adding random noise, and random noise is not what we are trying to measure.

2.3. Modifications to the list of dates

The birth date of Rabbi II-30, Rabbi Immanuel Hai Ricchi, doesn't appear in Margalioth and was not included in the WRR list. We found in another source that he was born on the 15th of Tamuz [Vil]. We note that in the first list WRR has brought in the birth date of the Besht despite the fact that it does not appear in Margalioth. We follow that precedent in this case, and add to the list of dates for Rabbi Immanuel Hai Ricchi the date forms י"ה תמוז, בי"ה בתמוז, י"ה תמוז, ט"ו תמוז, בט"ו תמוז and ט"ו בתמוז, as dictated by the rules of [WRR2].

2.4. Our list of appellations

The resulting new list of appellations is given in the table below:

The old and new lists, a comparative table				
#	Original entry	we remove	we add	new entry
1	האשכול, הראב"ד, הראב"י, הרב אב"ד, רבי אברהם			האשכול, הראב"ד, הראב"י, הרב אב"ד, רבי אברהם
2	זרע אברהם, יצחקי, רבי אברהם			זרע אברהם, יצחקי, רבי אברהם
3	המלאך, רבי אברהם	המלאך		רבי אברהם
4	אברהם סבע, צרור המר, רבי אברהם			--- completely removed ---

The old and new lists, a comparative table				
#	Original entry	we remove	we add	new entry
5	רבי אהרן			רבי אהרן
6	מעשי השם, מעשי י/ה/ו/ה		בעל מעשי ה', מעשי ה'	בעל מעשי ה', מעשי ה', מעשי השם, מעשי י/ה/ו/ה
7	אופנהים, רבי דוד			אופנהים, רבי דוד
8	דוד הנגיד, רבי דוד			--- completely removed ---
9	דוד ניטו, רבי דוד			דוד ניטו, רבי דוד
10	רבי חיים		המהרח"א, מהרח"א	המהרח"א, מהרח"א, רבי חיים
11	בנבנשת, רבי חיים	בנבנשת	בנבנשתי, הרב החבי"ב, הרב חבי"ב, רב חבי"ב	בנבנשתי, הרב החבי"ב, הרב חבי"ב, רב חבי"ב, רבי חיים
12	בעל הנס, בעל נס, כפוסי, רבי חיים	בעל הנס, בעל נס, כפוסי	כאפוסי	כאפוסי, רבי חיים
13	המהרח"ש, חיים שבתי, מהרח"ש, רבי חיים			המהרח"ש, חיים שבתי, מהרח"ש, רבי חיים
14	חות יאיר			חות יאיר
15	רבי יהודה		הר"י חסיד, יהודה סג"ל	הר"י חסיד, יהודה סג"ל, רבי יהודה
16	מהר"י עיאש, רבי יהודה		עאיאש	מהר"י עיאש, עאיאש, רבי יהודה
17	רבי יהוסף			רבי יהוסף
18	מגני שלמה, רבי יהושע			מגני שלמה, רבי יהושע
19	המהרי"ט, המהרימ"ט, טראני, יוסף טרני, מהרי"ט, מהרימ"ט, מטראני, מטרני, רבי יוסף		הר"י טראני, הר"י טרני, ר"י טראני, ר"י טרני	המהרי"ט, המהרימ"ט, הר"י טראני, הר"י טרני, טראני, יוסף טרני, מהרי"ט, מהרימ"ט, מטראני, מטרני, רבי יוסף, ר"י טראני, ר"י טרני
20	פרי מגדים, רבי יוסף, תאומים			--- completely removed ---
21	הריב"ר, יעקב בירב, מהר"י בירב, רבי יעקב			הריב"ר, יעקב בירב, מהר"י בירב, רבי יעקב
22	בעל הלק"ט, חאגיז	חאגיז	מהר"י חגיז, ר"י חגיז	בעל הלק"ט, מהר"י חגיז, ר"י חגיז
23	המהרי"ל, יעקב הלוי, יעקב סג"ל, מהר"י הלוי, מהרי"ל, מהר"י סג"ל, מולין, רבי יעקב			המהרי"ל, יעקב הלוי, יעקב סג"ל, מהר"י הלוי, מהרי"ל, מהר"י סג"ל, מולין, רבי יעקב

The old and new lists, a comparative table				
#	Original entry	we remove	we add	new entry
24	היעב"ץ, הריעב"ץ, הר"י עמדן, הר"י עמדין, עמדין	הר"י עמדן	ר"י עמדין	היעב"ץ, הריעב"ץ, הר"י עמדין, עמדין, ר"י עמדין
25	הורוויץ, יצחק הלוי, רבי יצחק	הורוויץ	הורוביץ	הורוביץ, יצחק הלוי, רבי יצחק
26	צמח צדק, קרוכמל, רבי מנחם, רבי מענדל	קרוכמל	קרוכמאל	צמח צדק, קרוכמאל, רבי מנחם, רבי מענדל
27	המהרמ"ז, המזל"ן, זכותא, זכותו, מהרמ"ז, מהר"ם זכות, משה זכות, משה זכותא, משה זכותו, קול הרמ"ז, רבי משה	זכותא, זכותו, משה זכותא, משה זכותו		המהרמ"ז, המזל"ן, מהרמ"ז, מהר"ם זכות, משה זכות, קול הרמ"ז, רבי משה
28	מרגלית, פני משה, רבי משה		מרגליות	מרגליות, מרגלית, פני משה, רבי משה
29	רבי עזריה			רבי עזריה
30	א"ח הע"ר, ישר לבב	א"ח הע"ר, ישר לבב	אוהב ור"ע, הון עשיר, העשי"ר	אוהב ור"ע, הון עשיר, העשי"ר
31	המהרש"ש, מהרש"ש, מזרחי, רבי שלום, שרעבי, שר שלום	המהרש"ש, מהרש"ש, מזרחי, שר שלום		רבי שלום, שרעבי
32	רבי שלמה		חעלמא, שלמה חלמא	חעלמא, רבי שלמה, שלמה חלמא
33	--- new Rabbi ---			איזנשטאט, איזנשטט, מהר"ם א"ש, רבי מאיר

We have shown our list of appellations (as it appeared in a draft version of this paper) to Professor Menachem Cohen, of the Department of Bible at Bar-Ilan University, Israel. In reference to our list and to the original WRR-Havlin list he wrote in [Co2]:

> ... I see no essential difference between the two lists for the purpose of using them for skip experiments in any text.

The present list is even more similar to the WRR-Havlin list than the one Cohen based his judgement upon.

3. The Results

The table below contains the permutation test ranks obtained by running our list against the same list of dates as in [WRR2] (with the addition of י"ה תמוז, בי"ה בתמוז, י"ה תמוז, ט"ו תמוז, בט"ו בתמוז and ט"ו בתמוז for Rabbi II-30, Rabbi Immanuel Hai Ricchi, and כ"ז סיון, בכ"ז סיון, and כ"ז בסיון for Rabbi Meir Eisenstadt), on an initial segment of War and Peace which is of the same length as Genesis, using the same four computation methods (P_1-P_4) used in [WRR2]. For comparison, we also include the scores obtained by running our list on Genesis and the scores reported by WRR in [WRR2] for their list on Genesis.

Permutation test ranks out of 10^8

	P_1	P_2	P_3	P_4
our list on War and Peace	20,887	1,091	831	57
our list on Genesis	14,179,712	1,299,355	16,825,659	724,260
the WRR list on Genesis ([WRR2], rescaled)	45,300	500	57,000	400

Comparing the first and the last two rows, we see that our list does as well on War and Peace as the WRR list does on Genesis. Tolstoy would have enjoyed knowing that. Some of the numbers in the second row are "middle of the way" - smallish but not very small. They are "smallish" because our list is highly correlated with the original WRR list, on which it was based. The fact that they are not very small needs to be explained by WRR, not by us. Why is it that an equally valid list of appellations (our list) does so much worse than their list on Genesis?

Comments: The computations of the significance levels for our list was carried out using a program functionally equivalent to a program WRR gave us, `els2.c`. The significance levels for the WRR list were taken from [WRR2], except for a rescaling by a factor of 100 to account for the the fact that they used only 10^6 permutations in their computations. Using our own program, which is equivalent to a program WRR produced when their lists were already present and hence it is more susceptible to bias, we get somewhat better results for the WRR list on Genesis, but these results are still weaker than our results on War and Peace. Unfortunately, we were not able to obtain from WRR the exact programs they used to compute the results in [WRR2].

The text we used was given to us by WRR. It consists of the first 78,064 letters (the length of Genesis) of a Hebrew translation of Tolstoy's War and Peace.

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