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Register in the Machine Translation and Human Translation: The Case of Steve Toltz's *A Fraction of the Whole*

Elyar Abadipoor[1], Roya Monsefi[2]*, Bahram Behin[3]

[1]M. A., English Department, Faculty of Letters and Humanities, Azarbaijan Shahid Madani University, Tabriz, Iran

[2*]Assistant Professor, English Department, Faculty of Letters and Humanities, Azarbaijan Shahid Madani University, Tabriz, Iran

[3]Associate Professor, English Department, Faculty of Letters and Humanities, Azarbaijan Shahid Madani University, Tabriz, Iran

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Abstract

The present case study aims to compare human translators and machine translation engines to determine the differences in transferring the register of the original text. Khaksar and Sohrabi as human translators are selected to be compared to Google and Targoman as translation machines. Steve Toltz's *A Fraction of the Whole* is selected to contain the data samples. The method is descriptive qualitative, and quantitative analysis is used to quantify the qualitative data. To deal with the concept of register, Halliday's register theory in systemic functional linguistics is used which mainly considers register as a concept for investigating the contextual factors that consist of three dimensions: field, tenor, and mode. The products of the four translators are analyzed and compared based on the Hallidayan register. The results demonstrate that humans have been able to transfer the register of the selected samples with higher quality than the machines. However, the difference in transferring the three dimensions of the register by each translator implies that there are similarities between the humans and the machines when transferring the dimensions of the register is considered since the distribution of problematic items among the dimensions of the register is extremely similar for all translators.

Keywords: Register, Literary Translation, Machine Translation, Human Translation, A Fraction of the Whole

INTRODUCTION

On the path to prosperity, communication with counterparts is necessary for all nations and ethnicities since social groups are interdependent by nature. However, one of the main obstacles in the way of verbal communication is the channel of communication itself, i.e. the nature of languages and the differing structures that languages own. Throughout history, this issue has been conquered mainly by translation and translators.

*****Corresponding Author's Email: *r.monsefi@azaruniv.ac.ir*

Translation has enjoyed significant progress through technological improvements: Austermuhl's (2014) insisted on the interaction between the information explosion and the agents in the field of translation, the positive influence of translation memories on translation consistency and speed is realized as not disputable by LeBlanc (2013), and even machine translation has empowered hope for automatic translation which needs no human intervention.

The light of hope, however, for a fully automatic translation machine has flickered through the past decades. Among the problems

of machine translation are the issues related to context. Any lingual utterance will not accomplish the goal for which it is uttered but with reference to the situation in which it is produced. In other words, as House (2015) reflects on Halliday's concepts, "the text must be referred to the particular situation enveloping it" (p. 63). House (2015) continues to explain that in order to produce a translation of high quality, situational dimensions should be transferred to the target text so it can hold the same function as the original text. Transferring the situational dimensions in the process of translation has been a challenge both for humans and programmed machines (computers).

Through decades, as Moore (2017) describes, scholars have shown endeavors to provide guidance toward a framework or a theory suitable for analyzing the context or situation of language use, but Hallidayan's concept of the register has attracted more attention since it can represent a more detailed analysis of the situation in which language has been produced.

Halliday (2004) builds the concept of register on the basis of his notion of instantiation: Language can be seen as an intertwined complex made mainly of "language as system" and "language as text". There exists an underlying system that acts as a meaning-making resource. Any text, produced in different contexts or situations, is an instance of that underlying system. In other words, a text produced in a given language is an instantiation of the underlying system of that language. Texts vary according to various strata of language, but these variations are systematic according to context. In a nutshell, text types are ways through which language emerges in different contexts. Viewed from the "system" extreme, text types are considered registers.

The importance of register in text analysis is made more outstanding when Halliday (1978) considers language a "social fact". The current study is oriented toward literary texts since the research has a literary piece as the data. It should be mentioned that from the point of view of literary figures, the social base and natural roots of a language are considered highly vital for the existence of that language; for example, Tolkien (1955), the great architect of invented languages, claims that his works have been "made rather to provide a world for the languages than the reverse" and should be considered as "linguistic aesthetic" (p. 232). (by "languages", Tolkien refers to his own invented languages).

According to literature (e.g., Somers, 2011; Lopez & Post, 2013; Matusov, 2019; Daems et al., 2020), register issues have been among the main sources of translation errors. The register issues need more focused investigation when they have to be observed in literary pieces because of their seriously different linguistic features, artistic representations, and unique worldviews which all together add to the complexity. Dealing with register issues becomes more complicated when working with programmed software instead of human translators.

Despite the existence of contextual issues in translation, high-quality rapid communication between nations is necessary for playing a more decisive role in the scene of global power relations. Paying attention to this central role of translation, in a period that time matters more than ever in history, and quality is demanded more than ever before, translation technologies are of importance.

Machine translation has shown significant progress to the extent that one can claim it has the potential to make the translation process faster while increasing its quality. However, recently designed machine translation systems still need more improvements to reach some level of acceptability. Since comprehending context and situation by machine has been among the ever-challenging issues of machine translation, this study can shed light on some parts of the issue.

Also, according to Saldanha and O'Brien (2014), case studies can be used for generating hypotheses and testing the viability of theoretical frameworks. Applying Register Theory to the products of machine translation might provide clues about the applications of Register Theory into the products of machine translation.

Moreover, as Jones (2009) argues, focusing on literary translation "can inform theories, models of practice, and research methodologies relevant to other genres, and vice versa" (p. 153). Incorporating new technologies into literary translation might be able to open new horizons.

The purpose of this research is to analyze the register in translations of a specific source text. These translations are the products of human translators and those of machines. Accordingly, the differences and similarities between human translations and machine translations, considering register, can be revealed. Such an analysis can help determine the ways register may or may not be preserved through translation by machine. Also, this analysis might reveal that translation machines may act better than human translators when transferring some aspects of the register. The focus is also on comparing the three aspects of the register (field, mode, tenor); i.e., to elicit which aspect is transferred better and which translator has transferred it with higher quality.

To achieve the purposes of the current study, the questions below are under investigation:

- Considering register, what are the differences between products of machine translations and those of human translations?
- Which dimension of the register is more problematic to be rendered in the machine translation and how can it be justified regarding the literary genre?

It should be pointed out that, since register is closely related to context and situation, the human translations that are selected are as similar as possible to the context, situation, and period of each other and those of the researchers. For achieving appropriate data with an acceptable volume of analysis, the products of two translation machines and those of two human translators are used. Google and Targoman are selected as the translation machines; Khaksar and Sohrabi as the human translators.

LITERATURE REVIEW

Systemic functional linguistics

From the Hallidayan point of view, language is beyond a mere tool for communication among the members of a community. As Halliday and Matthiessen (2004) have claimed, "a language is a resource for making meaning" (p. 23); Such a definition might embrace the communicating aspect of language as one of its many dimensions. Self-communication can also be another function of language when language is taken as a meaning-making resource. However, Halliday (1978) still considers language as a "social fact"; since language is the product of exchanging meaning among individuals whose relations are not empty of "social value". Referring to language as a social fact may be among the main reasons why Eggins (2005) considers systemic functional linguistics "a theory about language as social process" and "an analytical methodology which permits the detailed and systemic description of language patterns" (p. 21).

Considering language as a resource for making meaning, the process of linking one linguistic stratum (i.e. semantics, lexicogrammar, etc.) to another through communication is called "realization". All the strata of the communication process are embedded in the context; hence the importance of "register", the concept which is in close relation to the context, is inevitable. Moreover, in the categorization proposed by Bateman (2017), systemic functional linguistics "is, first and foremost, an 'in contexts' form of linguistic activity" (p. 14); it can be concluded that systemic functional linguistics might be among the most suitable frameworks for investigating issues related to the context.

Halliday and Matthiessen (2004) also claim that "meaning resides in systemic patterns of choice" (p. 23). Because of the systematicity found in the structure of the meaning network, a systemic theory is considered more suitable for studying language from Hallidayan's linguistic view. Another reason for adopting a systemic perspective, as Halliday and Matthiessen (2004) put it, is that evolving systems like language are not the sum of their parts; according to systemic theory, language is comprehensive and each part of the language contributes to the whole system reciprocally which means that the fraction and the whole are in permanent relation where each aspect of language should fit in order.

It can be assumed that language is a resourceful system, made of sub-systems each of which has a sort of contribution to forming the verbal structure. In other words, following the reflections of Halliday and Matthiessen (2004), the structure is about the patterns in "what goes together with what" and the system is about "what could go instead of what" (p. 22).

According to the systemic functional view of language, analyzing a text is representing the

functional organization of its structure and the meaningful choices that have been made while cutting the actual linguistic probabilities out of the whole potential. This might be parallel to Eggins's (2005) description when considering systemic functional linguistics as a functional-semantic approach to language owning the capacity to explain language structure and language use.

This is worth mentioning that the analytical power of systemic functional linguistics has been increasingly accepted. As an example, as Banks (2002) concludes, systemic functional linguistics, among other suitable approaches, provides an interesting, useful, and powerful analytical framework for text analysis and comparison; one outstanding reason is the distinction in systemic functional linguistics of three metafunctions within the semantic component of the model that almost highlights the features of the text in a particular objective manner. However, Banks (2002) does not limit systemic functional linguistics to a mere technique but considers it a theory of language.

Broadly speaking, as Asp (2017) elaborates, any language has three main functions: instrument, action, and system; however, in systemic functional linguistics, functions of language are specifically defined in more detail: the representation of experiences and logical relations between the events related to that experience is allowed through Ideational Function, the social aspects of linguistic actions are investigated through Interpersonal Function, and organization of information in terms of speaker's inclinations can be seen through Textual Function. In Hallidayan terms, these are called Metafunctions.

Drawing a synchronized image of the relation between language organization and language function needs a new concept that is defined as "instantiation" and clarified using the climate-weather simile by Halliday and Matthiessen (2004); the climate is the vast perspective of various kinds of weather through a relatively long period of time, which means that text is to language system as the weather is to climate. Text is an instantiation of the language system and language is not the sum of all possible texts. Realization and instantiation synchronically produce a text. A broader concept, called supervenience may be extant in the strata of language, especially in the context stratum, since, as Bartlett (2017) explains, "context is itself semiotic – that is, a cultural artefact, rather than a set of external material features to which linguistic behavior is merely a response" (p. 382).

The two poles of system (language) and instance (text) are connected through the cline of instantiation on which intermediate patterns will be found. Since Halliday and Matthiessen (2004) claim that "texts vary systematically according to contextual values", the intermediate text types are considered as registers if looked at from the point of view of the system pole; accordingly, the register is defined as "the patterns of instantiation of the overall system associated with a given type of context" or, simply, as "functional variety of language" (p. 27).

For the purpose of suitably connecting language to non-language, Halliday (1978) has drawn on the concept of "context of situation" which refers to relevant features of the environment to the language used; and not the whole environment with all its details. Halliday (1978) brings the example of "I love you" which might be said to Mary, and not to Jane, and "can you put up a prescription for me?" which might be addressing the role of a chemist, and not the person occupying this role. In other words, as Bowcher (2017) describes, "the features of the specific situation are realized in the language used in that situation"; this concept is called "relevancy" (p. 394).

Another complexity of dealing with register, as Halliday (1978) elaborates, is that in a given situation, numerous threads of meaning might be in work; like the melodies of a chord. The multi-threading process makes it more challenging to relate the environmental factors to language variations, however.

As Bartlett (2017) elaborates, through systemic functional linguistics, language is assumed to be a supervenient system, which means features of lower strata combine to create higher-order types, and, based on this notion, Halliday found that "the overall networks of meanings divided into three relatively discrete sets": ideational metafunction, interpersonal metafunction, and textual metafunction (p.

380). Through supervenience and metafunctions, the relevance between the context and the semantic network has been brought under control to a more extent.

Considering reflections of Halliday (1978) brought in this part, register becomes a question about "which kinds of situational factor determine which kind of selection in the linguistic system" (p. 32). This might be in line with what Bowcher (2017) calls "Halliday's preferred approach to describing language", that is finding "linguistic consistencies" or "patterns" (p. 392).

As Bartlett (2017) has elaborated on Hallidayan's terms, each of the three internal metafunctions of language, ideational, interpersonal, and textual, are particularly associated with aspects of the situation, labeled field, tenor, and mode, respectively. Eggins (2005) has also explained that only these three variables of the situation have a significant and primary impact on the type of language used.

Halliday and Hassan (1989) explain that these variables, which are briefly defined below, "serve to interpret the social context of a text, the environment in which meanings are being exchanged" (p. 12):

- Field of discourse describes the source of engagement and the nature of social action; i.e. what is happening that it has been able to engage the participants in a conversation or dialogue, and that language has been playing a functional role in it? for example, the concepts and requests created in the mind of a child at play might be an instance of the field; a conversation may be built upon the child's request for a new piece of toy.
- Tenor of discourse describes the nature, statuses, and roles of participants; it might consider both the speech role of participants in a specific context or their social position in the whole social system. Tenor of discourse gives special importance to the social relationships among the participants. An example of tenor of discourse could be the status of a churchman towards the listeners when giving a speech on television; i.e. the churchman has authority, both religious and specialistic, towards the listeners.
- Mode of discourse describes the part language plays. This aspect of the register considers the nature of the linguistic channel through which the generated meaning is represented. Any utterance can be produced orally or as written and can be received in both ways, so, as an example, the mode of a given register can be written to be spoken aloud or written just to be read.

Other than the three metafunctions, as Bowcher (2017) elaborates on Hallidayan conceptions, the three features of the register are also associated with certain features of the language system; field with the system of transitivity, tenor with the systems of mood and modality, and mode is associated with the systems of theme and information and choices in cohesion.

It should be noted that, as Bowcher (2017) explains, there is a sort of interdependency among the three features of the register. Such interdependency drives realization towards being a probabilistic concept. As a result, overlap among the features of the register might be inevitable.

Hallidayan Register in (literary) Translation

Zequan (2003) suitably summarizes the application of the Hallidayan register in the works of prominent translation scholars: In the context of systemic functional linguistics, Marco (2001) has considered the register as a good framework for dealing with issues of context, Hatim and Mason (1990) have seen register as an important part in processing discourse affairs, House (1997) has realized register as the basis of an essential model for analyzing situational items in translation products, and Baker (1992) has considered register as a concept for defining textual equivalence.

Based on Halliday (2001), equivalence in translation might be reached in various strata, ranks, or metafunctions, but when the equivalence is gained in the higher rank or stratum, or in interpersonal and textual metafunctions, it is usually more valuable; so, from the point of view of the register analysis, an equivalence is more valuable when the characteristics of tenor and mode are transferred suitably, since transferring field is a prerequisite for calling a text translation.

In literary translation, dealing with register means dealing with a more specific situation

since, as Marco (2001) explains, literary texts "are embedded in a double contextual frame": "the outer context of situation" considers the communication between the author and the readers, whereas "the inner context of situation" is about the fictional characters (p. 2). However, Marco (2001) believes, the register is the most appropriate concept for investigating contextual issues because it can define the context based on a very limited number of variables and relate the contextual factors and the linguistic elements very closely.

The importance of register analysis in human translation is not deniable since plenty of effort has been spent on it, however, mainly as a part of broader studies. The famous model for translation quality assessment proposed by House (2015) is a notable example that is used in many English-Persian case studies, among which are: Alavipour and Noroozi (2020), Kargarzadeh and Paziresh (2017), and Anari and Varmazyari (2016). Neumann (2021) believes translators have to respond to register variations found in the source text and such variations are related to the variations in translations which can be compared to both the original texts and the non-translated target texts. Neumann (2021) also claims that systemic functional linguistics can learn from register-oriented translation studies because registers may contain various patterns from one language to another. However, it seems there have not been plenty of translation-oriented studies that can focus on the register itself.

Comparing Register in the Machine Translation and Human Translation

A minor part of the vast research area dedicated to machine translation is devoted to the English-Persian counterparts. Most of the studies are general quality assessments, and some have focused on issues such as ambiguity. However, Bonyadi (2020), through an investigation of translations produced by Google's machine translation system, has categorized the essential issues of the mentioned system among which is "word choice". Bonyadi (2020) has emphasized contextual comprehension, too. These issues are in direct relation to register characteristics.

Lapshinova-Koltunski and Vela (2015) have compared German translations of English texts, both human and machine, to German non-translated original texts. They have provided evidence that "usage of parallel corpora in machine translation should be treated with caution" since "human translations might be prone to errors" (p. 122). This idea is based on the truth that corpora used for feeding translation machines are large collections of texts produced by humans. It seems no other study has focused to this extent on register in the context of machine translation. However, plenty of studies refer to register as a vital part of their results, some of which are explained below.

Somers (2011), when discussing lexical ambiguity as an issue of translation machines, points to translation errors that are not because of homonymy or polysemy in the source language but because of "subtle distinctions made in the target language" (p. 3). He brings register problems in translation as an example of these errors.

Lopez and Post (2013) count five open problems in machine translation, among which are "translation across domains" and "translation of the informal text". The first refers to the poor performance of translation machines when translating texts whose underlying properties are different from those of training data. The latter refers to problems related to the translation of informal text because of scarce bitexts. The two mentioned problems are closely related to register issues.

Matusov (2019), through research about challenges of neural machine translation for literary works from English and German to, respectively, Russian and English has classified the encountered errors into ten categories. The tenth category is entitled "tone/register error". Among his conclusions is that neural systems of machine translation need to improve beyond translation style and genre. This conclusion, and such error, is a clear sign of the necessity for considering features such as a register.

Comparing features of human translations and neural machine translations of English classic literary texts into Dutch, Daems

et al. (2020) have shown that "style & register", after "mistranslation" and "coherence", are among the most frequent errors in translations done by neural translation machines. However, they have genuinely claimed: "Although mistranslation may be seen as an error type that is fairly common to all types of NMT, coherence and style & register are specific to literary NMT" (p. 17). They have concluded that neural machine translation systems can be used to aid human translators.

Daems et al. (2017), in a comparative study on human translation and post-editing, have concluded that post-editing can be a "viable alternative" for human translation after adding the respective training courses to translation curricula. Their study had an English-Dutch basis. A comparative study of the register between machine translation and human translation can produce beneficial results for designing such a curriculum.

In a case study, Kenny and Winters (2020) have shown that the translator's voice may be diminished in some aspects if post-editing is used instead of human translation; and register is one of the three features analyzed. However, the main focus is on human translation.

Considering the literature that insists on problems of machine translation related to contextual and situational issues and specifically register, a research gap is felt which can be filled with a detailed comparative analysis of register between machine translation and human translation with a particular focus on literary texts.

METHODOLOGY

Theoretical Framework

The present study is based on Hallidayan systemic functional linguistics and, specifically, the register theory is used.

According to Halliday's (1978) definition, the three dimensions of register can be analyzed as below: Through tenor, choices determined by the social and interpersonal relationships are dealt with while special attention is paid to the systems of mood and modality. Through field, choices determined by the nature of social action and the source of engagement are analyzed with more consideration of the system of transitivity.Through mode, choices determined by the role of language are under observation with more focus on the systems of theme and information.

Register, according to Moore (2017), is translatable since registers are different in their "internal semantic organization"; this is in contrast to some other linguistic terms such as dialect which cannot be generated in other languages. So register analysis can be applicable to translations and their source texts.

A comparison of register features in the product of machine translation and that of human translation might develop a beneficial interaction between the two. To achieve a detailed descriptive analysis of register in the translation products of machines and humans, this study is a comparative analysis of four translations of one original piece.

Data Selection

Samples are selected from five works. Systemic random sampling is used to provide a general view of the context. The original work is titled *A Fraction of the Whole* authored by Steve Toltz (2008). Toltz becomes worldwide known by publishing his first novel *A Fraction of the Whole* which has been shortlisted for the Man Booker Prize. A provocative indictment of the modern world and its conventions, reading *A Fraction of the Whole* is a unique experience. Each page includes a significant quotation. It is a profound exploration into the depth of the human soul and the nature of civilization whose alike cannot be found easily. It is a deep adventurous philosophical novel that enthralls the reader for months.

Two translations were done separately by Google and Targoman, both of which are neural machine translation systems. Two other translations were selected from among versions translated by human translators: Peyman Khaksar (2014/1393) and Golnaz Sohrabi (2021/1400).

Google and Targoman were selected because they are the trending neural machines today. Also, the present study aimed to investigate the most well-known domestic and international machines; so, some aspects of technological improvements might be compared.

Human translations were selected from among the well-known pieces. Khaksar's translation is the first and the most sold version of this piece. Sohrabi's translation is the most recent version among the most welcomed since it is the last translation that has enjoyed reprint. By choosing two translations instead of one, the standard of acceptability will not be limited to the style of one translator. The original work, an Australian novel, was published first in 2008 and has been one of the best-sellers of the current century. A vast portion of the text, like most novels, consists of narrations and colloquial language. However, a significant part of the novel contains various contextual situations: letters, notes, diaries, and even encrypted riddles are communicated among various characters through different channels.

For reaching an extensive account of the whole work, a paragraph per fifty pages in the source text and its equivalent paragraphs in the target texts were selected to gather a total count of fourteen samples. To prepare more homogeneous data, it was tried not to select the beginning paragraph and the ending paragraph of any of the chapters or parts and also the climactic segments since literary texts tend to be more fascinating through the mentioned parts.

Considering the machines, the selected paragraphs in the source text were copied separately and then, one by one, pasted into the respective layouts inside the translation machines' interface. In both machines, the default settings were used.

Data analysis Procedure

The samples were analyzed based on the procedure of register analysis. In other words, features of the register were analyzed, first, for the source sample and, then, for the target samples. Through analyzing field, the source of communicative engagement was investigated; for example, a paragraph in a diary about a bitter marriage. Through analyzing tenor, the roles of social participants and their relationships were investigated; for instance, the mentioned paragraph might be read by the diary writer's son whose relationship might be informal and not formal. However, in the case of literary texts, tenor analysis can be seen from various aspects: the relation between the literary author and the reader of that literary work or the relation between the characters created in that literary piece. This double relationship is in close connection with Marco's (2001) terms of inner and outer context. Through analyzing mode, the lingual medium was under investigation; for example, whether the sample has been written to be read in one's mind or written to be spoken aloud.

Then the register profile of each target text was compared to that of the source text; so the pros and cons of each translation, considering register, could be revealed. At last, the registers created in human translations and machine translations were compared and contrasted.

Results and Discussions

Notes on the Details of the Analysis

Some points have to be mentioned below for the sake of transparency in the analysis process.

Each sample consists of five paragraphs: the first one is from the source text and the respective four different target texts are put in order as by Khaksar, Sohrabi, Google, and Targoman; all of which are labeled respectively by ST, TT_K, TT_S, TT_G, and TT_T.

The results of analyzing each sample are recorded in separate tables: one column for the source sample, one column for each target sample, and three main rows for the register variables. Through field, which is in bond with the system of transitivity, the processes are listed using abbreviations in parentheses: material (mat.), behavioural (beh.), mental (men.), verbal (ver.), relational (rel.), and existential (exi.). Through tenor, which is connected to the system of mood and system of modality, mood elements and elements of modality are listed. Through mode, which is concerned with the thematic system and information system, topical themes and focalized elements are listed. If there is a suitable functional target item for each source item, that item is brought. If the target item is not suitable, it is marked with an asterisk. In case of lacking a target item, --- is used. When there is no target item, the case might be suitable or not; the latter is also marked with an asterisk. All the compared source items and target ones are listed in a way to be in the same row.

Choice-determiner contextual factors are explained for each sample through each register variable since, based on Halliday (1978), the register is about "which kinds of determining situational factor" are related to "which kind of selection in the linguistic system" (p. 32). All the analyses are done based on this relationship, i.e. detailed awareness of the contextual factors.

The quantity of items under each element is counted and recorded in rows labeled by the letter Q. For the source items, the number presents the total count of items. But, for the target items, the number projects the count of functionally deviant items in relation to the original piece; that is the reason why these numbers are marked by a minus. The numbers are used to quantify the qualitative analysis. At last, these quantities are used to compare the performance of each translator, considering the different variables of the register.

For the lack of space, one sample and its respective analysis, as explained above, is brought through the following pages to represent an example of the analysis process:

Sample Instance

ST

What’s this shit about a book? No one will shut up about it. If you get a sec, straighten that out, will you? I don’t want to be known as a writer. I want to be known as a vigilante who liberated sport from the dirty hands of corruption. Not for scribbling some stupid book.

TT_K

ماجرای این کتابه چیه؟ همه دارن درباره‌ش زر می‌زنن. اگه وقت داری قضیه رو واسه‌م روشن کن، باشه؟ دوست ندارم کسی فکر کنه من نویسنده‌م. می‌خوام همه منو مامور خودسری بدونن که ورزش رو از دست‌های کثیف فساد نجات داد. نمی‌خوام واسه نوشتن یه کتاب مسخره معروف بشم.

TT_S

این کتاب کوفتی چیه؟ هیچ کی راجع بهش خفه‌خون نمی‌گیره. اگه وقت داری، لطفا راست و ریسش کن. می‌شه؟ نمی‌خوام به عنوان یه نویسنده شناخته شم. می‌خوام به عنوان پارتیزانی شناخته شم که ورزش رو از دستان کثیف فساد نجات دادم. نه به خاطر سرهم کردن یه کتاب احمقانه.

TT_G

این چرت و پرت کتاب چیست؟ هیچ کس در مورد آن ساکت نخواهد شد. اگر شما یک ثانیه، آن را صاف کنید، می خواهید؟ من نمی خواهم به عنوان یک نویسنده شناخته شوم. من می خواهم به عنوان فردی هوشیار شناخته شوم که ورزش را از دستان کثیف فساد رهایی داد. نه برای نوشتن یک کتاب احمقانه.

TT_T

این چه مزخرفاتی درباره یک کتاب است؟ هیچ کس در این باره سکوت نمی کند. اگر سکوت کنید، آن را صاف کنید، آیا من نمی خواهم به عنوان یک نویسنده شناخته شوم. من می خواهم به عنوان یک متعصب شناخته شوم که ورزش را از دست های کثیف فساد آزاد کرد. نه به خاطر نوشتن یک کتاب احمقانه.

Choice-determiner contextual factors

Field: As the last sample taken from Martin's (one of the main narrators and also characters in the novel) oral autobiography toward Jasper (Martin’s son), this paragraph is a part of Terry's (Martin’s half-brother) letter to Martin while Terry is prisoned for his high number of murders and Martin is planning to leave Australia since Martin is also under pursuit for editing Harry's (Terry’s criminal mentor) norm-struggling book "A handbook for criminals" which is mistakenly published under Terry's name. Terry's extremely colloquial tone, similar to common criminal characters, needs special attention through translation.

Tenor: The multi-level communication in this part is also significant. The letter is written by Terry, then narrated by Martin, and then directed to the readers by Jasper. In other terms, the readers are listening to three characters at the same time.

Mode: written to be read individually or (maybe) loudly.

Table 1

	Γ		TT_K	TT_S	TT_G	TT_T
Field (system of transitivity)	Processes	's (rel.), will shut up (mat.), straighten out (mat.), don't want (mat), want (mat),	ـه (rel.)، زر می‌زنن (mat.)، روشن کن (mat.)*، دوست ندارم (men.)*، می‌خوام (mat.)	ـه (rel.)، خفه‌خون نمی‌گیره (mat.)، راست و ریش کن (mat.)، نمی‌خوام (mat.)، می‌خوام (mat.)	-یست (rel.)*، ساکت نخواهد شد (mat.)*، صاف کنید (mat.)*، نمی خواهم (mat)*، می خواهم (mat.)*	است (rel.)*، سکوت نمی کند (mat.)*، صاف کنید (mat.)*، نمی خواهم (mat.)*، می خواهم (mat.)*
	Q		-2	0	-5	-5

Table 2

		ST	TT_K	TT_S	TT_G	TT_T
Tenor (systems of mood and modality)	Mood elements	What's, No one will, strai-, I don't, I wa-,	چیه، همه دارن، روشن - *، - ندارم، -خوام	چیه، هیچ کی ... - نمی‌گیره، راست و ریسش -، ن-م،-خوام	جیست*، هیچ کس ... نخواهد شد*، صاف*، من ن-م*، من –خواهم*	چه ... است*، هیچ کس ... نمی کند*، صاف*، آیا من ن-م*، من –خواهم*
	Q	5	-1	0	-5	-5
	Modality					
	Q	0	0	0	0	0

Table 3

		ST	TT_K	TT_S	TT_G	TT_T
Mode (systems of theme and information)	Topical themes	this shit about a book, No one, straighten, I, I,	ماجرای این کتابه، همه، روشن کن، -م، -م	این کتاب کوفتی، هیچ کی، راست و ریسش کن، -م، -م	این چرت و پرت کتاب*، هیچ کس، صاف کنید*، من، من	این ... مزخرفاتی درباره یک کتاب*، هیچ کس، صاف کنید*، من، من
	Q	5	0	0	-2	-2
	Focalized elements	this shit, No one, will you, I don't want, as a vigilante	---*، همه، باشه، دوست ندارم*، مامور خودسر	---*، هیچ کی، می‌شه، نمی‌خوام، به عنوان پارتیزان*	---*، هیچ کس، می خواهید*، من نمی خواهم*، به عنوان فردی هوشیار*،	مزخرفاتی، هیچ کس، ---*، من نمی خواهم*، به عنوان متعصب*
	Q	5	-2	-2	-4	-3

Notes

The original paragraph is written in a colloquial tone and register used by common characters who might be explicitly against the norms of society. Also, the mentioned paragraph is part of a letter that is apparently written rapidly and probably as short as possible. The whole letter is only three paragraphs. The two other paragraphs are shorter than the one brought here as a sample. Considering the description brought under the current note, one may expect the target paragraph to represent such colloquial features. The translations produced by Targoman and Google lack the feature of colloquiality so, in field, the translation of the processes by the machines may not be acceptable; the types of processes are transferred suitably, however. Also considering field, Sohrabi has transferred the types of all processes, their meanings, and their colloquiality, but Khaksar has changed the process type and meaning of "don't want" and the meaning of "straighten … out" which does not seem suitable. In tenor, Google and Targoman have transferred the mood elements and their meanings suitably except the meaning of the element "strai-", but the suitable degree of formality is not observed yet; i.e. informal language is translated to totally formal language, the translation feature which corrupts the style of the original text. Sohrabi seems to transfer all the mood elements suitably and Khaksar has not transferred the meaning load of "strai-". The only problem with the topical themes, in mode, is the unacceptable meanings of "this shit about a book" and "straighten" translated by Google and Targoman. Also in mode, the full meaning load of the focalized element "this shit" is only transferred by Targoman; this issue may be related to censorship protocols when investigating the human translations and the larger corpora used by Google when investigating the machines. Considering mode, the tag question "will you?" is translated acceptably by the humans but not by the machines. Also among the focalized elements, only Sohrabi has transferred the acceptable meaning and degree of formality related to "I don't want" and only Khaksar has translated the essential term "as a vigilante" into its exact meaning in the target language. One last point about the current sample is to be mentioned about the item "No one". This item is translated into "همه" in Khaksar's translation and into "هیچ کی" or "هیچ کس" in the other translations; the former means "everyone" and the latter two means "No one". Khaksar's translation has reversed the meaning of the whole sentence containing "No one", which represents an acceptable equivalence.

DISCUSSION

To achieve a vast perspective of the results related to the whole samples together, the quantity of asterisked items is summarized in tables. Surprisingly, it is observed that all the variables which are considered related to register dimensions, except elements of modality, show homogeneous results. That means, the quantity of asterisked items listed under all the other variables, i.e. processes, mood elements, topical themes, and focalized elements, has the lowest rate for Sohrabi and the highest rate for Targoman; Khaksar and Google occupy the second and the third rankings respectively. The quantities are summarized below in tables 4.1, 4.2, 4.3, 4.4, and 4.5:

Table 4.1

The quantity of problematic processes with totals counted in the last row

	Sample no.	ST	TT_K	TT_S	TT_G	TT_T
Processes	1	10	-3	0	0	0
	2	10	-1	-2	-1	-4
	3	9	-2	-3	-3	-7
	4	6	-2	0	0	0
	5	5	-2	0	-5	-5
	6	3	-1	0	-1	-2
	7	7	-2	-1	-1	-2
	8	4	-1	0	-1	-3
	9	17	0	-1	-9	-17
	10	4	-1	-2	-2	-2

	11	6	-1	-2	-2	-2
	12	11	-3	-5	-5	-7
	13	5	-1	0	-1	0
	14	4	0	-1	0	0
	Total	101	20	17	31	51

Table 4.2
The quantity of problematic mood elements with totals counted in the last row

	Sample no.	**ST**	**TT_K**	**TT_S**	**TT_G**	**TT_T**
Mood elements	1	5	-1	0	0	0
	2	5	0	0	0	-3
	3	7	0	0	-1	-3
	4	6	0	-1	0	-1
	5	5	-1	0	-5	-5
	6	3	0	0	0	-1
	7	3	-1	-1	-2	-1
	8	3	-1	0	-1	-2
	9	17	0	0	-4	-17
	10	4	0	-1	-2	-2
	11	6	0	0	-2	-2
	12	10	-1	-1	0	0
	13	5	-2	0	-2	-1
	14	4	-1	-1	0	0
	Total	83	-8	-5	-19	-37

Table 4.3
The quantity of problematic elements of modality with totals counted in the last row

	Sample no.	**ST**	**TT_K**	**TT_S**	**TT_G**	**TT_T**
Elements of modality	1	2	-2	-1	0	-1
	2	4	-1	0	-1	-3
	3	1	0	0	0	0
	4	0	0	0	0	0
	5	0	0	0	0	0
	6	1	0	0	0	0
	7	0	0	0	0	0
	8	0	0	0	0	0
	9	0	0	0	0	0
	10	0	0	0	0	0
	11	0	0	0	0	0
	12	0	0	0	0	0
	13	0	0	0	0	0
	14	1	0	0	0	0
	Total	9	-3	-1	-1	-4

Table 4.4
The quantity of problematic topical themes with totals counted in the last row

	Sample no.	ST	TT_K	TT_S	TT_G	TT_T
Topical themes	1	5	-1	0	0	0
	2	6	0	0	0	-3
	3	7	0	0	0	-1
	4	4	-1	0	0	-1
	5	5	0	0	-2	-2
	6	3	0	0	0	-1
	7	3	-1	-1	-1	-1
	8	3	0	0	-1	-1
	9	18	0	0	-3	-15
	10	4	0	-1	0	0
	11	6	-2	0	-2	-2
	12	10	0	0	0	0
	13	3	0	0	0	0
	14	3	0	0	0	0
	Total	80	-5	-2	-9	-27

Table 4.5
The quantity of problematic focalized elements with totals counted in the last row

	Sample no.	ST	TT_K	TT_S	TT_G	TT_T
Focalized elements	1	4	0	0	0	-1
	2	3	0	-1	0	-2
	3	4	0	0	-3	-3
	4	5	-1	0	-1	-1
	5	5	-1	-2	-4	-3
	6	6	-2	-1	-1	-1
	7	3	-1	0	0	-1
	8	3	-1	-1	-1	-2
	9	16	0	0	-9	-12
	10	4	0	0	0	-1
	11	7	-2	-2	-1	0
	12	7	0	-1	-2	-4
	13	6	-2	-1	-1	-3
	14	3	0	-1	0	0
	Total	76	-11	-10	-23	-34

The high measure of homogeneity observed in the results is a sign that all four translators, human or machine, share difficulties in transferring register in the same area, the same variable, and the same dimension of register. It means that, if the count of modality elements is not considered, each translator has the lowest percentage of asterisked items in translating the topical elements and the highest percentage in translating the processes, and this is true for all four translators. In this comparison, mood elements and focalized elements are placed in the second and third positions, respectively. All the quantities are rendered into percentages and summarized in one table for the sake of easier comprehensibility in *Table 4.6*:

Table 4.6.
The total percentage of problematic items for variables related to register dimensions by each translator

%	TT_K	TT_S	TT_G	TT_T
Processes	19.80	16.83	30.69	50.49
Mood elements	9.63	6.02	22.89	44.57
Elements of modality	33.33	11.11	11.11	44.44
Topical elements	6.25	2.50	11.25	33.75
Focalized elements	14.47	13.15	30.26	44.73

The only variable that distorts the homogeneity of the whole results is modality which might be because of the extremely low number of items found in the selected samples; with a high number of modality elements, the results are predicted to be completely homogeneous.

To move the perspective from the variables toward the dimensions of register, i.e. field, tenor, and mode, the values related to modality elements might be ignored since the number of modality items is seriously low. As a result, the dimension of tenor could be considered only concerning the mood element. Also, the values related to topical themes and focalized elements could be combined to produce one value for the dimension of tenor. At last, the dimension of field is only related to the values found for the processes. In this sense, the dimensions of register could be met directly; the results of which are summarized in *Table 4.7* by percentage

Table 4.7.
The total percentage of problematic items considering register dimensions for each translator

%	TT_K	TT_S	TT_G	TT_T
Field	19.80	16.83	30.69	50.49
Tenor	9.63	6.02	22.89	44.57
Mode	10.25	7.69	20.51	39.10

The values in *Table 4.7* represent the percentage of the asterisked items related to each translator for each dimension of the register. The same order is observed in each row: all the dimensions contain the least problematic items for Sohrabi and the most problematic items for Targoman; Khaksar and Google are respectively in the second and third ranks. However, considering the translators as the main variables demonstrates a division in the homogeneity between the machines and the humans. Humans have the least number of problems in tenor and the most number of problems in field, but the machines have the least number of problems in mode and the most number of problems in field.

One other interesting note that has to be mentioned is the difference in values related to each translator. The difference between the values related to Google and Targoman, for each dimension, is extremely higher than the difference between Khaksar and Sohrabi. Also, the quantity of problematic items related to tenor in human translation is extremely lower than the other values. One may already expect this issue since tenor is related to communication among various characters with different social positions, and human translators will act better when transferring tenor. However, considering the machines, the interesting point is that the quantity of problematic issues related to tenor is not the highest which is despite the fact that one may expect the machines should show more problems in tenor than the other dimensions because the machines are not able to comprehend human relationships. Noteworthy is also that, field contains the most problematic items considering all four translators.

Statistical analysis of the results represents the statements below (while modality is almost ignored because of the inherent insufficiency related to the number of modality items):

- For all four translators, the quality of translating the variables related to dimensions of register, excluding modality, could be ranked in descending order as topical elements, mood elements, focalized elements, and processes.

- Considering the quality of transferring each of the variables, else modality, all translators could be ranked descendingly as Sohrabi, Khaksar, Google, and Targoman.

- When the dimensions of register, i.e. field, tenor, and mode, are considered, the quality of translating each dimension could be descendingly ranked as Sohrabi, Khaksar, Google, and Targoman.

- Human translators have been able to transfer tenor better than mode. Also, they have been able to transfer mode better than field. This is one of the differences between machines and humans.

- The machine translators have been able to transfer mode better than tenor, and tenor better than field.

- Google has acted better than Targoman in transferring register.

- Considering the human translators, Sohrabi has acted better than Khaksar.

- The difference in quality, considering the transference of register dimensions, between Google and Targoman is more than the difference between Khaksar and Sohrabi.

Based on the conclusions above, the research

questions could be answered in the following way:

In response to RQ1 considering register in translation, the humans and the machines acted very similarly according to the relative quantity of problematic items in each variable related to the dimensions of register for each translator, but they acted differently in two manners:

- First, humans could transfer the register better than machines in nearly most cases. One might assume this answer is predictable. The point, however, is that, in some cases, the products of machines were very close to acceptability. In other words, machine translation is prone to improvement more than ever in history.
- Second, humans offered better results in tenor than the other dimensions of the register while the machines did the same in mode. Both dealt with the largest number of problematic items in the dimension of field. This is a sign that machines were able to deal with the role of language itself better than humans. In another sense, machines had analyzed the issues related to textual metafunction better than humans. This case can be justified according to the fact that computers can analyze texts statistically more accurately than humans and, of course, faster. However, computers have not achieved contextual awareness of human relations as much as humans themselves; so, humans have offered better results than machines in the dimension of tenor.

In response to RQ2, the number of problematic items in field in the translations produced by the machines appears to be larger than the number of those in the translations produced by the humans. This issue might be justified due to the literary features of the selected data. Field is related to the processes used in the text. In the case of scientific texts, legal documents, and alike, the processes used might be less in quantity and show less diversity. In the literary genre, the diversity found in the texts is higher than in the other genres; the processes may diverse in degrees of formality, metaphoric meaning, expressional idioms, etc. Dealing with such diversity is not as simple as other dimensions of register since Google and Targoman use neural networks to feed their engines which are built based on human translations, and human translators themselves have not acted in field better than other dimensions of the register.

CONCLUSION

The current research is an effort towards investigating the differences in translations produced by humans and machines from the perspective of Hallidayan register theory. As a case study, samples were selected randomly from the four translations of Toltz's (2008) *A Fraction of the Whole*, by Khaksar (2014/1393), Sohrabi (2021/1400), Google, and Targoman, and analyzed in comparison to each other.

With the use of a comparative-qualitative method, the research questions were proposed to investigate the differences between products of machine translations and those of human translations considering the dimensions of register (i.e. field, tenor, and mode), and to determine the most problematic dimension for the machines paying attention to the literary aspects of the data.

The samples were gathered randomly from the entire novel and the respective translations were analyzed in the framework of systemic functional linguistics since systemic functional linguistics embraces contextual and social factors better than most other approaches. The results of analyzing each sample were compared to the source samples and the other translations based on the register theory. The number of problematic items was used to statistically measure the quality of the translations produced by each translator considering the aspects of register. To achieve a meaningful relation between the dimensions of register through the process of translation, all the quantities were calculated by percentage.

The homogeneous distribution of the problematic items was observed in all dimensions of the register. Considering each dimension of the register, Sohrabi had the lowest number of problematic items; Khaksar, Google, and Targoman ranked the next positions, consecutively.

Considering the translators, there was a division in the homogeneity of data; the humans acted in tenor better than the other dimensions,

and the machines acted in mode better than the other dimensions. All the translators had the highest quantity of problematic items in field. It is noteworthy to mention that in human products the quantity of problems related to tenor was extremely lower than the other dimensions of register. Another interesting point related to the translators was that the difference between the quality of Google and Targoman's products was more than the difference between Khaksar and Sohrabi's work.

According to the relative quantity of problematic items in each variable related to the dimensions of register, Google and Targoman acted very similarly to the selected human translators; however, human translation quality was significantly higher than the machines in total, but the machines transferred the variables related to mode better than the other variables. The human translators and the machines presented most of their problems in field. This might be justified by the fact that neural translation machines use human-translated texts as their feeding source, and humans had the most difficulty in transferring the processes in the dimension of field which projected more diversity in the literary genre.

The results of the current study could be assumed as a sign that systemic functional linguistics in general and register theory in specific might play a useful role in dealing with some aspects of problems found in machine translation and human translation. The role of register theory is especially tangible regarding literary translation products.

This study also might help to bring humans and machines to a better and closer state of interaction. The signs of a better interaction could be focused where instances of machine products are better than those of humans. As an example, the modality elements "almost" and "seemed" is only transferred acceptably by Google's engine to "تقریبا" and "به نظر می‌رسید", but not by the other translators. Another example is the focalized element "Something secret and sinister" which is translated to "چیزی مرموز و شوم" and "چیزی مخفی و شوم" respectively by Khaksar and Google while Targoman and Sohrabi are not as successful since Sohrabi's equivalent is "راز شرورانه‌ای" and Targoman has not even transferred the mentioned item. Such improvements might be signs of a hopeful future for the systems of machine translation.

The fruit of register-oriented strategies might be the higher quality of translation products since contextual issues are counted among the most repeated translation problems and play a significant role in the final products of translation.

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Biodata

Elyar Abadipoor holds an M.A. in Translation Studies from the Department of English, Azarbaijan Shahid Madani University, Tabriz, Iran. His research interests include Machine Translation and Translation and Technology.
Email: *elyar.abad@gmail.com*

Roya Monsefi is an Assistant Professor of Translation Studies and the Head of English Department at Azarbaijan Shahid Madani University, Tabriz, Iran. She received her Ph.D. in Translation Studies from Universiti Sains Malaysia, Penang, Malaysia. Her research interests include children's literature in translation, translation quality assessment, and translation and media.
Email: *r.monsefi@azaruniv.ac.ir*

Bahram Behin is Associate Professor of TESOL who received both his BA in English Language and Literature and his MA in English Language Teaching from Tabriz University. He continued his studies towards a PhD degree in Linguistics and Literature in the University of Adelaide, Adelaide, Australia. He has been a full-time academic member of English Department in Azarbaijan Shahid Madani University since he returned from Australia in 1997. He is the founding editor-in chief of The Journal of Applied Linguistics and Applied Literature: Dynamics and Advances **(JAL**DA**).**
Email: *bahram.behin@gmail.com*