University of Twente

Predictive Characteristics of Item-difficulty and discrimination for 2F Dutch Reading Comprehension Exams

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Abstract

Item difficulty and item discrimination are indicators of the evidence strength of items in an assessment. Methods of determining these indicators leave room for improvement. Identifying task features of assessment items that influence these indicators could create a systematic and accurate method for quality assurance, reduce pre-testing expenses and improve assessment quality. This study attempts to find such task features within the 2F reading comprehension items (N = 128 items) that form the basis of the Dutch central exams for intermediate vocational education (MBO). This study will focus specifically on task features related to the information within the text that is necessary to respond to the items, among which are the propositional complexity, abstractness and the necessity to draw inferences. These task features are identified and coded through the use of concept mapping. The selected task features are analysed in regard to the extent to which they correlate with- and can predict variation in both item difficulty (p-value) and discrimination (Rir). These values are provided by Cito and are derived from test administration data collected between 2010 and 2018. Multiple information features were found that correlate with item difficulty and discrimination.

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Introduction

Without high-quality assessment it is not possible to draw valid conclusions on the progression of learners and other types of performers or organizations. In other words, without assessment we thus cannot make such decisions accordingly. Current ways to determine assessment-quality leave room for improvement. For example, one way to determine the quality of assessment is through the use of experts. However, these experts can be unreliable and prone to variance (Roelofs, Keune & van Hofwegen, 2019; Sydorenko, 2011). Often the use of experts is combined with further pre-testing of the assessment at hand. Because if this is not combined it can lead to unequal versions of examination and disappointing reliability. Pre-testing, or the trialling of exam materials with students before they are used, is a second example. Though this leads to more stable and accurate results, it is relatively expensive and time consuming. In addition, pre-testing often shows items to be too difficult or having too low of a discriminatory ability. This may lead to waste of expenses and time on items which turn out to be unusable.

An alternative method, and potential solution to these problems, could be based on the use of the psychometric measures of the items within an exam. Mislevy, Steinberg and Almond (2002) pointed out hat features of tasks can be used to manipulate psychometric properties of an item, including determining item difficulty and discrimination. Whether an item is well-suited for the purpose of an assessment is often determined by two measures: item difficulty and item discrimination (Roelofs et al., 2019). Item difficulty is the measure of the proportion of examinees who responded to an item correctly. To ensure assessment quality the difficulty of the items has to be attuned to the intended target group. Item discrimination refers to the ability of an item to differentiate between the capable and incapable test-takers. A high score on discrimination means the item makes a good distinction between such test-takers.

By explaining the variance in these psychometric measures, by finding correlating task features, a prediction could be made about the psychometric measures of other items with similar features. Previous studies have been able to find such characteristics (Freedle & Kostin, 1991; Chon and Shin, 2010; Brizuela & Montero-Rojas, 2014). The research listed here are studies focused on the assessments of reading comprehension, which is also the focus of this study.

Finding task features that predict difficulty and discrimination has a number of benefits. First, as priorly discussed, such features can lead to an accurate assessment of the functioning of items and could reduce the expenses related to pre-testing. Second, it could reduce the number of items which are removed from an examination after pre-testing. The

removal of such items can be explained by a lack of insight into the factors that determine the difficulty and discrimination of items (Roelofs et al., 2019).

In addition, several researchers have found other benefits. First, Lumley, Routitsky, Mendelovits and Ramalingam (2012) found that understanding the contribution of such item features has the potential to better understand the target skill of an assessment. This means more insights into the mental processes that come with the execution of the target skill. Second, a system of item characteristics can make existing processes of item-construction and review more transparent and transferable (Enright, Morley & Sheehan, 2002; Chon & Shin, 2010). Third, understanding these characteristics forms a basis for systematic design formats, which is beneficial for creating and selecting parallel equivalent items. In addition, such a basis could be beneficial for automatic item generation (Enright et al., 2002; Chon & Shin, 2010; Gorin & Embretson, 2006). Finally, more knowledge about difficulty levels allows for a better sequencing of difficulty levels concurrent with subsequent curricular goals (Enright et al., 2002; Chon & Shin, 2010), which also allows for better results deriving from computerized adaptive tests (Pandarova et al., 2019).

For this study an attempt will be made to find such predictive features for items in the Dutch reading comprehension exams of the 2F language proficiency level used in the intermediate vocational education (MBO) in the Netherlands, using he best available evidence from literature on testing reading comprehension. This study is conducted within the *Department of Psychometrics and Research* of the Dutch National Assessment institute: Cito. It will make use of, and can be understood as a continuation of, prior research conducted into the same topic using these reading comprehension tests of the 2F level conducted by Roelofs et al. (2019). In that study a total of 53 item- and text-characteristics were defined, coded and then analysed for their contribution to item difficulty and item discrimination. The relation between the characteristics and the psychometric measures was analysed, using test data from students collected during the period between 2010 and 2018. The characteristics analysed in this study mainly focused on the general text and tasks features. As a recommendation for future research, it was suggested to include variables related to the information within the text that needs to be used for responding to a specific item, such as: propositional complexity, abstractness, layering within the information and the use of inferences. The study described in this paper will follow a similar method, however with a focus on those characteristics related to the necessary information that has to be derived from a text to correctly respond to a particular test item. The research question for this study is:

Which task features, related to the information within in a text necessary to respond to reading comprehension exam items, are related to item difficulty and discrimination?

A first indication for which task features are expected to be found is based on literature regarding the assessment of reading comprehension and research into predictive task features. A summary of the most relevant findings in this literature is given in the section 'Theoretical framework'. In order to further isolate and define task features the process of concept mapping will be used. Through this process a schematic overview of the necessary information is created. This schematic overview is expected to reveal task information features and allows for transformation of these features into data. The process is further described in the 'Method' section of this paper. Explorative, regression analyses then give further information to the predictive capabilities of the found information features. These analyses are additionally described in the 'method' section. The results of these analyses are presented in the 'Results' section of this paper. Finally, the 'conclusion and discussion' are presented. This last section includes the contribution of this research to practice and theory. In addition, the limitations and suggestions for further research are discussed.

Theoretical framework

In this section essential theories and concepts are introduced that inform about the processes of reading comprehension and as such contribute to the development and improvement of the assessment of reading comprehension. In this approach item quality is evaluated by investigating how and to what extent item features elicit the essential cognitive processes. First, two prominent models which form an understanding of reading comprehension are presented. These models have formed the conceptual basis for the study into task features of Dutch reading exam items. Second, different ways of understanding reading comprehension as a target skill for assessment are presented. Third, more information in regard to the exams and their constituting items central to this study is given, followed by a description of the evidence-centred design employed to reconstruct the task features underlying the items. Fourth, findings of previous research into the prediction of item parameters, as indicators of item quality, are provided. Finally, concept mapping is discussed as a method to identify text information elements that are necessary to solve reading comprehension tasks, which is a central part of the method of this particular study.

Reading comprehension

Central to this study is the assessment of reading comprehension. In order to find predictive characteristics for item difficulty and item discrimination within these types of assessment it is relevant to understand the process of reading comprehension. Following are descriptions of two prominent models that describe and explain how readers arrive at meaning when reading a text. Principles of these models have been used to logically construct a framework of item features, to investigate what drives item difficulty and item discrimination in Dutch exams for mother tongue reading in vocational education, specifically for the 2F level.

Reading systems framework. Figure 1 displays the *reading systems framework* as designed by Perfetti and Stafura (2014). It demonstrates how a reader gives meaning to a text through the decoding of written words and sentences. The reader constructs this visual input into a mental representation of the information in the text. This representation is defined as the *situation model*. To construct this situation model the literal information within the text is interpreted using the already existing information in the readers' memory.

The construction of the situation model can thus be described as a 'top-down' and 'bottom-up' process. The top-down process is driven by the pre-existing knowledge of the reader. For example, 'difficult' words can sometimes better be understood when understanding them through words with similar meaning already existing in one's memory. There are three

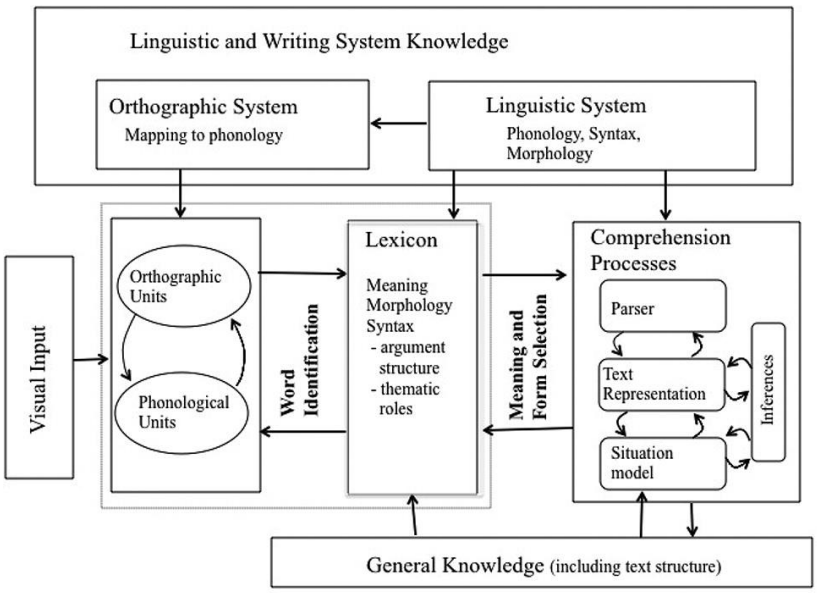

Figure 1. The Reading Systems Framework by Perfetti and Stafura (2014)

classes of which pre-existing knowledge can exist when it comes to reading comprehension. These are linguistic knowledge, orthographic knowledge, and general knowledge. General knowledge includes knowledge about the world in addition to knowledge of text forms and, for example, text genres. The bottom-up process is driven by word-based processes, or visual input existing of reading the written text. These include the following processes in stepwise order: the recognition of words, selection of meaning and word-forms from the existing lexicon of the reader, dissecting sentences and/or groups of words into coherent units of information, creating a representation of the literal information of the text, and finally the creation of the situation model.

Construction-Integration model. The top-down and bottom-up processes are also referred to in the 'CI-model' (Construction-Integration) by Kintsch (Kintsch & Rawson, 2005). Top-down and bottom-up processes are both essential for text comprehension, according to this research. The CI-model describes the way these two interplay. According to Kintsch (2005) it is our pre-existing knowledge that guides our comprehension when we read a text, which is the top-down process. The bottom-up process, which comes from the text, constrains our comprehension in order to arrive at the correct understanding of the meaning of its author.

The model by Kintsch describes three different levels of processes which are combined to make a full model of text comprehension. The first two levels can be described as bottom-up, the third combines this process with the top-down process. The first level is that of the *linguistic level*. Here graphic symbols on a page are decoded and a factual representation, as obtained from the written words and sentences in a text, is created. Second are the processes

leading to the constructing of the so-called *textbase.* The textbase exists of micro- and macrostructures within the text:

- *Microstructures* are complex networks linking propositions on a local level. A proposition is understood as a combination of words from which meaning can be derived. A local level within a text is referring to propositions within a sentence or a paragraph. This network can be complex. This is mainly due to the fact that several propositions at the same local level can refer to the same concepts. Meaning that a reader has to be able to understand the references of these propositions to arrive at the correct understanding. In addition, knowledge-based inferences, or the process where the reader has to conclude something which is not literally represented within the text, are often necessary to construct these complex networks. This is also referred to as implicit information. The opposite of such information is called: explicit information. These are text-based inferences, which are also necessary to construct the network, but are considered less difficult since they are literally represented within the text. In this case the reader needs less cognitive capabilities or pre-existing knowledge to correctly understand the information within a text.
- *Macrostructures* are the global structures of a text. These refer to the topics within the text and their inter-relationships that concern the text in its entirety. For example, a macrostructure of an informative text can be ordered in different ways, such as: sequential, causal, hierarchical or 'nested'. In comparison, a narrative text with the purpose of storytelling can have a macrostructure existing of the setting, characters, conflicts, plot or solution. Together these structures form a representation of the propositions, or ideas, of the entire text and all it's components.

Third is the priorly discussed *situation model*. In the model by Kintsch (2005) the situation model consists of the textbase combined with relevant prior knowledge of the reader. This combination allows a deeper understanding of the text. Where the textbase-level could be sufficient for reproducing the text, the situation model represents the meaning of the text as it is actually expressed. This makes the third level crucial when it comes to providing meaning. It is this level which allows a reader to develop new structures of reading (Kintsch, 2005; Perfetti & Stafura, 2014)

Inferences play an important role when constructing both the textbase (at the micro- and macro-level) and are crucial when forming a situation model (Kintsch & Rawson, 2005). Inferences can be understood as the information which is not literally present within the text, but still part of the information. These gaps are to be filled by the reader. Many inferences are made with little effort by the reader. Especially when the reader is familiar with a topic. In such

a case inferences are straightforward processes of knowledge activation. This becomes more challenging when the reader is unfamiliar with the topic. Then the inferences necessary to be made can require conscious control and significant effort. Without this effort the reader can not derive new knowledge from the text.

Reading comprehension as target skill

To successfully isolate and define task features which are related to the difficulty and discriminatory ability of an item, it is important to understand the complex process of reading comprehension as a target skill for assessment. Assessment frameworks for exams provide insight into what a competent performance in reading comprehension means and the ways these are judged. Following are summaries of two of such frameworks.

The Reading literacy model by PISA. The 'reading literacy' model by Pisa consists of three sub-skills that a reader uses when involved in reading comprehension (OECD, 2018). These skills are used to guide the development of assessment. The first strategy is to *access and retrieve* information. It describes the reader as someone going to the correct information space and navigating within that space to sort out relevant pieces of information. In order to successfully do so the student needs to understand the task demands, the ways texts are organized and needs to have an ability to assess the relevance of a text or text-part. 'Accessing' refers to the act of finding where the necessary information is located, within a text or document. Once students have located the correct text(-part) they then only have to derive the necessary information from the text, which is called 'retrieving'. The model by PISA also states that a competent reader is able to 'search and select relevant text'. For this to occur a situation is necessary in which the student has to select information from more then one text. This is however not relevant for this study. Within the 2F Dutch reading comprehension exams students are mainly required to find relevant information within a text and, to a lesser extent, information within a table or figure. Task demands do not include finding information within a book or database.

The second skill relates to *integrating and interpreting.* In other words, it includes the group of reading activities which involve the parsing and integration of texts in order to form an understanding. Understanding may be seen as the construction of the previously discussed situation model. This involves two processes: the representation of literal meaning and integrating the literal text with prior knowledge through the inference process. The representation of literal meaning requires readers to understand sentences or short passages. Tasks related to this are to match a question to the target information within a short passage. Integrating literal text with prior knowledge involves written text ranging from a sentence to entire texts. To do so the reader needs to generate different inferences. These can be simple

(such as finding antecedents or referrals) or more complex (such as spatial, temporal, causal or claim-argument links). Sometimes inferences may even refer to the general purpose of a text or text passage.

The third skill involves to *reflect and evaluate*. The created mental representations of the information are related to pre-existing knowledge, ideas or attitudes of the reader. By doing so conclusions can be drawn by the reader in regard to the value of the information the reader has received. To 'reflect' entails a reader using their pre-existing knowledge to compare the new information to the information which the reader already knows. Furthermore, the reader can discover certain contrast between new and old information and could hypothesise about the reason these contrasts exist. To 'evaluate' means that a reader makes a judgement using information that is beyond the given text. This could mean that the reader concludes the new information that is derived from a text is factually wrong since it doesn't match pre-existing knowledge, or the logic behind the new information is not sound according to the understanding of logic by the reader. The exam central to this study does not intend to measure this skill. It only contains items related to the two previously described skills. This is because the 2F proficiency level does not require students to reflect upon or evaluate a text.

Language arts literacy model. In research by Deane et al. (2015) a distinction is made between five skill layers that are used in comprehension tasks. Following is a summary of their findings, which are mainly focused on reading since this is more relevant for this study, and to a lesser extent to writing, listening and speaking. In short and starting with the most elementary level, the five layers are:

1. *Print Model:* Includes recognizing en producing language in formal, phonological or orthographic terms. In other words, it refers to the decoding of printed text into words and sentence. Such tasks require knowledge in phonetics, grammar-rules, word-recognition, knowledge about sentence structure and typographical conventions.
2. *Verbal Model:* Refers to the process of understanding and transferring meaning for words and sentences. Students need to use their understanding of grammar and lexicon to give meaning to the written text. In order to do so a student must possess a rich lexicon and knowledge of expressions to be competent to this level.
3. *Discourse Model:* Refers to the ability to derive the propositional content (train of thought) from a text through the textual structures and devices chosen by the writer. The ability to do so is closely related to understanding text genres. Genres can be understood as groups of text sharing similarities in format, contact and meaning. These similarities can be observed in the structure of a text, vocabulary, sentence-structure and overall tone. Not all structures are explicitly given in a text. A competent reader is

able to derive an implicit message by using pre-existing knowledge about the topic and context of a text. In order to do so a reader needs knowledge about text-structures, genres, and different styles of writing.

4. *Conceptual Model:* Refers to the ability to form an abstract representation of ideas. It requires readers to bring together the information of the text with pre-existing knowledge of the reader. This creates the before mentioned situation model. To do so students need to connect ideas to each other, which leads to a better understanding of the information. This requires the ability of abstract thinking, examples of this are categorization, argumentation, causal reasoning or logical inferences.
5. *Social Model:* Refers to the understanding of social situations and interactions which are described within a text. To be competent at this level means that the reader is able to understand the meanings of the writer, to place themselves within different perspectives, and to demonstrate empathy with different views. Tasks at this level focus on the emotional intelligence of the students and on the way people read between the lines to infer intended and implicit meanings of the writer.

The 2F exam central to this study contains items which refer, to some extent, to all five models as presented by Deane et. al. (2015). To further illustrate this, a description of the assessment blueprint for the 2F Dutch reading comprehension exams is added.

2F Dutch reading comprehension exams

The 2F reading comprehension exam is an assessment for a specific level of Dutch language proficiency. 2F refers to the second, out of four, fundamental reference levels introduced by the Dutch government. The 2F level is part of a framework which forms the basis for education in the Dutch language. This framework describes broad levels of Dutch language skill which are used for setting curriculum standards for different levels of education. The 2F level is for the user of the Dutch language who can manage as a student of the intermediate vocational education (MBO) and as a citizen within Dutch society. The 2F level is described as the level one needs to be functional within Dutch society, or in other words; the proficiency level every Dutch citizen should meet.

There are six aspects of reading comprehension assessed within the 2F-examination (College voor toetsen en examens mbo, 2018):

1. *Reading technique and vocabulary:* For this aspect the student must be proficient to read and understand the text and, if necessary, is able to derive the meaning of unfamiliar words through the form, composition and/or context present in the rest of the text.

2. *Understanding:* The capable student can provide or select a representation of the main idea of a text. In addition, the student can differentiate between main- and side issues; connect the information derived from different sections within the text (introduction, core, conclusion); and can order information for a better understanding. Last, the student can recognize figurative speech. This entails that students must be able to understand a text on micro- and macrolevel.
3. *Interpreting:* the student can connect information from the text with common knowledge. In addition, the student can formulate the intention off a text, in addition to formulating the intention off specific parts of a text (introduction, paragraphs, etc.). Furthermore, the student is able to indicate specific formulations. In all these cases the interpretations are close to the original text. So, students do not have to perform major thinking steps to find out the intention of the author.
4. *Evaluating:* Students are able to judge whether certain information in the text is relevant, important or valuable in a certain way. This judgement is based upon the context in which the text is presented and the accompanying items. In addition, they can indicate whether two sections are in fact claiming the same thing or are contradicting each other.
5. *Summarising:* The student is able to summarize a simple text. Students only have to perform an indirect form of summarization for the 2F proficiency level. This means students are only asked to determine which out of a few provided possible options is the best or correct summary. Or students are asked to select whether a sentence should belong in a summary of the text or not.
6. *Searching:* A competent student can systematically search for information on the internet or in the school' libraries. For example, searching based on the use of keywords. Students may be asked for information, for example in a table, or to determine where in a table of contents, or a row of Internet links, they expect to find useful information.

Evidence centred design

To further understand the way reading comprehension is assessed in the 2F examination the Evidence Centred design (ECD) is shortly described. The ECD forms the basis for the study into item-difficulty and discrimination by Roelofs et al. (2019). In addition, the ECD-model forms the basic-structure for the design of the 2F examination. The model exists of several sub-models which have to be aligned with one another. Limitations in one of the models can result in a contamination of the conclusions that are drawn upon student performance and thus reduces the validity of the assessment. In other words, the ECD-model

can provide insights into factors influencing the quality of an assessment, of which item difficulty and discrimination are indicators. This model can further be used to improve upon examination since it bases the design of assessment on validity (Mislevy & Hearthel, 2007). The model can be used by assessment designers to aim for the best coverage of target attributes and relevant task situations (content validity), the best coverage of the target behaviour (construct relevance), and to prevent disturbing factors in content, administration and scoring (construct irrelevance). The following description of the ECD-model is limited to the most important models, which are: the student model, the task model and the evidence model.

The student model contains that what the assessment designer is attempting to measure. In other words, a description of the target skill of the assessment is elaborated in this model. This can refer to different forms of competency, such as knowledge, skills, attitudes, strategy, or a combination. The performances of students are described in variables that reflect different competency levels. This should take into account the relevant curriculum standards or agreed upon outcomes. It further includes the processes a student goes through when handling a test item. This includes in which task situation an attribute is shown, how students will progress during development, and which obstacles students may have to overcome. The depth in which these components are described depends on the purpose of the assessment. In short, the student model answers the question: *What does a competent performance look like?*

The task model contains information about the task itself and the different features of a task that need to be specified during the creation of a task. In other words, it focusses on a specific context which initiates a certain type of behaviour. A task can be understood as an activity with a certain goal which is meant to be conducted in a specific manner, context or circumstance. The information in the task model should include the task situation, content, factors which influence the difficulty of the task, support, structure and how the students are asked to respond to a task. The description of the task features plays a central role in the construction, management, and presentation of the assessment tasks. The tasks should elicit mental processes, which are described in the student model. The task model answers the question: *Which assessment tasks are needed to gain information about the student?*

The evidence model can be seen as the bridge between the two above mentioned models. In this model it is described how the performance of students is registered and transformed into scores. In addition, how to score these performances, how to combine these scores and the standard setting method are found in the evidence model. In other words, the evidence model answers the questions: '*What counts as evidence for proficiency?'* and *'How to interpret evidence to arrive at a conclusion about the target skill?'*

Predictive task features

Discerning task features. As previously described, the ECD-model differentiates between the task-model, which can be summarized as the description of essential task features, and the evidence-model, which describes how student behaviour in response to tasks represents a level of competency in regard to the target skill. The task features described in the task-model play an important role when evaluating the validity of the assessment (Mislevy et al., 2002). First, task features help to distinguish, and thus help alter, essential- and surface features, which allow the creation of different tasks which are equivalent in difficulty. Second, task features allow the creation of tasks with varying difficulty levels based on theoretically relevant task features. Third, task features can optimise evidential strength by using features which establish a correlation between item difficulty, or item discrimination, and the target skill of the assessment.

Discerning such task features with this ability starts with a thorough understanding of a particular target skill, for this study this is reading comprehension. Relevant aspects of the target skill may include what students use to solve a task, what information they have to process, and the steps they take in solving a task. After the relevant features are defined, they are to be assessed for the extent to which they influence the psychometric measures of the assessment tasks (Roelofs, Emons & Verschoor, 2020). This is important since task models will be created upon these assumed relations. Finding empirical evidence for these relations thus enhances the validity of the task model. Previous research studies have already established task features for reading comprehension assessment items which correlate with difficulty of an item. In the following paragraph the findings of these studies are described. It should be noted that relatively little research exists into task features and their relations to item discrimination, in comparison to research into the relation between task features and difficulty. Why this lack of research exists is unknown. Roelofs, Emons and Verschoor (2020) speculate that it is because the dominating psychometric literature focuses on predicting the difficulty such as the often used linear logistic test model.

Previous research on task features in reading comprehension items. Research into task features in reading comprehension assessment items come in different forms. They can differ in focus; between focussing on understanding differences in the psychometric measures within the theoretical context on the one hand and creating a statistical prediction model on the other. Other differences exist due to the focus of a specific reading comprehension assessment, such as a certain level of competency or reading comprehension for a second language. However, the assessment of reading comprehension usually focusses on the different sub skills of the target skill as described earlier in our theoretical framework. For example, items can

focus on the meaning of words, which is the assessment of the linguistic level. Other items focus on the comprehension of the text base, for example when a student is asked to explain the connection between two paragraphs in which a cause and effect is given. Or a student can be asked to explain the meaning of a text in their own words, in this case the item focuses on the situation-model.

The focus of an assessment determines which task features are relevant for analyses. These analyses can help improve validity of the assessment and contribute to the understanding of which tasks features contribute to item difficulty or discrimination. A wide variety of task features have been used in such studies. In the study by Roelofs et al. (2019) a categorisation of these task features was established based on literature study. This study categorised these features into the following groups: text features, information task features, skill features and task presentation features.

Text features are related to either the language used in the text or the type of information described within a text. Examples of these features related to the text and language are the length of a certain passage (Gorin & Embretson, 2006), or the number of words and word-frequency measures (Chon & Shin, 2010). Characteristics related to the type of information could include the subject of text (Chon & Shin, 2010) and the level of concreteness of the information (Lumley et al., 2012; Brizuela & Montero-Rojas, 2014).

Information task features are related to the structural relationship that exists between the text and the accompanying question or directive (Kirsch & Mosenthal, 1990). These features initiate, and thus influence, the mental activity of the candidate. These features determine the "size" of the information which has to be used (or necessary information), the type of mental activity, and which factors will influence the cognitive capacity. Examples of such features from former research are the number of organizing categories required by a task (Kirsch & Mosenthal, 1990), concreteness of the information necessary to successfully complete a task (Gorin & Embretson, 2006; Lumley et al., 2012), location of relevant information (Gorin, 2005), and familiarity of the candidate with the information and inferential processing (Chon & Shin, 2010).

Skill features are related to the target skill. Examples of such skills are summarizing, organizing information or recognizing the main purpose of the author (Roelofs et al., 2019). In prior research it has been analysed whether or not a difference exists in difficulty between items which required a student to perform such a specific skill. The same has been done for access skills, such as whether or not a necessary vocabulary level of the student is required for an item (Chon & Shin, 2010).

Finally, the task presentation features. These features can relate to the ways an item has to be responded to, and the way the question, or probe, is presented. For example, the number of words in the correct and incorrect options (Chon and Shin, 2010), or the plausibility of the incorrect options; also referred to as distractor options (Lumley et al, 2012).

In the study by Roelofs et al. (2019), a total of 53 features were selected from other studies in order to analyse the extent to which these features contributed to item difficulty and item discrimination. However, this study included limited features which represent the type of information within a text or the density of this information. Roelofs et al. (2019) did include the theme of a text as one of the features for analyses, which somewhat represents the type of information. Themes can be, for example, 'careers' or 'dimensions of citizenship'. For the density of information no features were included. For the 2F proficiency level it can only be noted that the density of information is 'not low' (as it is for the 1F level) and 'not high' (as with the 3F level).

The study by Roelofs et al. (2019) suggested that further research should be conducted into task features which better describe the type of information and the information-density. This was suggested since a large variance in item-quality was observed between different texts of the 2F level. Several suggestions for task features for further research were made. First, it was expected that task features related to the propositional complexity of a text would further explain item difficulty. In prior research propositional complexity was found to significantly enhance the difficulty of an item. Second, different types of elements of information could be categorised based on literature. Such types may include facts, concrete or abstract concepts, rules, or processes. In addition, different relations may exist between such elements of information. Examples of such relations are temporal, causal and conditional. These types of information could be features of the situation model a student has to comprehend in order to understand a text. To summarise, Roelofs et al. (2019) suggested to analyse task features related to the propositional complexity of a text, layering within the information, abstractness, and type of inferences.

Concept mapping: modelling the information model below the text

In this study, the main focus will be on text-characteristics related to information. One reason that these characteristics were not included in the study by Roelofs et al. (2019) is the lack of guidelines towards the way in which these characteristics can be coded. To cope with this lack of guidelines the method of concept maps was applied. Concept maps have been a powerful learning instrument for students in order to better comprehend a text. However, as such, expert concept maps could be used to represent the information of a text.

Concept maps are graphical tools for organizing and representing knowledge (Novak & Cañas, 2006). Within these representations concepts are linked to one another to indicate a relationship, which indicates a form of meaning. Concepts can be understood as a singular word, or group of words, often presented in a concept map within a box or circle. When two concepts are connected by a line, which represent a relationship, a proposition is formed. Novak and Cañas (2006) define a proposition as two or more concepts which form a meaningful statement. It is assumed that for this reason concept maps are suited to analyse propositional complexity, since concept maps could give an indication of the total number and (different) types of propositions within a text. Propositional complexity has been found to influence the difficulty of a text significantly in several studies (Sonnleiter, 2008). Another assumption on why concept maps are well suited to analyse information models behind a text is related to the hierarchical structure of concept maps. Novak (2004) states that good concept maps have a hierarchical structure in which the most prominent concepts take a central position, often at the top, in a concept map. This is understood as a representation of the layering of the information behind a text. In addition, concept maps could provide insight into the extent to which information is explicitly present in a text. For example, (expert) concept maps could indicate the explicitness of a text by differentiating between concepts that are literally derived from the text or added by the creator of the concept map. Finally, the number and type of inferences that are made could potentially be analysed through concept maps. Inferences refer to using two or more pieces of information to come to a third piece of information which was not given (Kispal, 2008), and are known to influence the difficulty of reading comprehension (Chon & Shin, 2010). These inferences could more easily be represented by visually differently styled lines connecting concepts in a concept map, which represent relationships. In addition, concept maps can relate to different types of structures in relationships between concepts, such as: spatial, temporal or causal relationships.

Concept maps can be considered as a form of cognitive modelling. A cognitive model is a term used for a broad variety of representations that describe human knowledge and problem solving (Gorin & Embretson, 2013). Concept maps represent the different inferences and relations a reader could make to understand the meaning of a text. If successful, the concept maps can thus help to shed light on a key subskill of reading comprehension, such as: the forming of a mental text representation, a conceptual model or a situation model. More insight into the ways reading comprehension items address the (expert) conceptual model, and how in turn this affects item difficulty and evidence strength, can help to improve construct validity of reading comprehension.

It should be noted that part of this study is to find ways concept maps can shed more light on variables related to the information within a text. Based on the description of concept maps provided by Novak and Cañas (2006) it is assumed that this is possible. The goal is to create representations that cover the meaning of a text, including plausible implicit information which is necessary to understand this meaning. However, there is no consensus on the depth these concept maps should have, or what is understood as 'plausible', in order to accomplish this goal. Either way, it is important to determine the extent to which types of information elements and relations between these elements, more specifically the information necessary to correctly respond to a test item, are associated with item difficulty and discrimination.

Research questions

The main focus of this study is the question which information-related characteristics contribute to item difficulty and item discrimination within the 2F Dutch reading comprehension exam items. The main research question of this study is:

Which task features, related to the information within in a text necessary to respond to reading comprehension exam items, are related to item difficulty and discrimination?

In addition, this study will attempt to answer the following sub-questions

1. *Which task features of the necessary information to respond to reading comprehension assessment items within a text can be defined and isolated?*
    a. *Which task features can be defined and isolated related to the type of information?*
    b. *Which task features can be defined and isolated related to the relations within the information?*
    c. *Which task features can be defined and isolated related to the matter of implicitness?*
2. *To what extent are the defined and isolated task features related to item difficulty and item discrimination?*
3. *To what extent do the selected task features predict item difficulty and discrimination in addition to the features selected in the previous research by Roelofs et al. (2019)?*

The first sub-question is divided into three different questions based on different aspects related to the information within a text. These different aspects where chosen based on recommendations for further research by Roelofs et al. (2019). Question 1a focuses on the types of information which are presented. Types of information can refer to people, substances or events. These make up the concepts within a concept. These concepts can also be referred to as information elements. In addition, other information features taken into analyses can refer to

whether this information is abstract or not. All relevant features of information types are described in the method-section. For question 1b characteristics related to the relations between elements of information (concepts) within a text are defined. Different types of relations (such as: causal, exemplary or defining) and the number of relations connected to an element of information are expected to be relevant features for this question. The number of relations connected to a single element of information can give further insights into the propositional complexity of the information. Propositional complexity was listed for further research by Roelofs et al. (2019). An overview and further description of the types of relations used can be found in the method section. Question 1c focusses on the matter of implicitness. Whether implicit information is necessary for responding to an item was already analysed in the research by Roelofs et al. (2019). However, due to the use of concept mapping further insight into the amount of implicit information, and the type of implicit information, is analysed in this study. The research by Roelofs et al. (2019) showed that the number of inferences necessary to respond to an item strongly contributed to item difficulty.

The second sub-question involves an investigation into the features that are related to item difficulty and item discrimination. Item difficulty is expressed by using the p-value of each item. Item discrimination is expressed by the use of an item total correlation (Rir) score.

The final sub-question combines the findings of the research by Roelofs et al. (2019) and the findings of this study. The attempt here is to arrive at a more fine-grained explanation of the variance between items in difficulty and discrimination than was previously done in the study by Roelofs et al. (2019). In addition, combining the findings of both studies can serve a descriptive purpose. Findings of this research can further elaborate upon previous findings explaining which the effects of task features which are described in task model. This can help to better align the construction of assessment items with the target audience. In addition, these findings can help to describe the information used in reading comprehension examination by Cito in a systematic fashion. For example, more insight is provided into how the information within a text may differ even if texts are described by similar themes.

Method

Research design

This research can be split into two parts. The first, and main purpose of this study, is a quantitative study. It can also be described as explorative, since there is little evidence or support for which task features, related to the information which is necessary for responding correctly to an item, can predict item difficulty and item discrimination in reading comprehension exams. Possible characteristics are defined and isolated through the use of concept mapping. Little existing knowledge also exists in regard to using this method to find characteristics related to the information of a text. The features are then analysed for the extent to which they correlate with item difficulty and item discrimination. Finally, an attempt is made to improve upon the prediction models for item difficulty and item discrimination from the study by Roelofs et al. (2019) by adding the newly created task features in the study central to this paper.

The second part of this research serves a descriptive purpose. The selected task features provide further insight into the information used in the 2F exams. This information can be used to systematically analyse the items and how they map on the test domain. In addition, these findings could be used as a bases for further item development.

Units of analysis

Existing data will be used, which were gathered by Cito between 2010 and 2018. In total the data relates to 192 texts and 1032 associated test items. In this study 18 publicly accessible texts and five confidential texts, and their accompanying items, are used. Originally the study by Roelofs et al. (2019) was only allowed to use 18 texts which were made publicly accessible. However, these 18 texts did not provide sufficient variation in p-values and Rir-scores to create a predictive model, as was determined by Roelofs et al. (2019). To achieve sufficient spread, five confidential texts, and their 27 accompanying items, were added. This brings the total of items at the beginning of this study to 128, associated with 23 texts. The same 23 texts, and 128 items, were used for analysis in the research by Roelofs et al. (2019).

The test data used involves scored student responses to the selected 128 items. Psychometric analyses revealed mean p-values over the course of time the items were used in exams. Similarly, mean corrected item-total correlations were calculated for the items as they resulted from different exam versions in which they had appeared in the period 2010 and 2018.

Instrumentation

2F reading comprehension exam. The Dutch exam for mother tongue, reading comprehension exam central to this study is of the 2F-level, as introduced by the Dutch government, related to Dutch language proficiency. The texts used are authentic, meaning they are not written for the exam, but taken from newspapers, magazines, the internet, or other similar sources. Some texts are edited to make them better suited for examination, which in most cases means the texts are abbreviated. The topics of the texts are somewhere between concrete and familiar (1F-level) and abstract and varied (4F-level). The selected topics for the 2F level are varied and should coincide with the life and experiences of the MBO-students (College voor toetsen en examens mbo, 2018). Specific curriculum subjects- or profession-related subjects are not used since they could provide an unfair advantage to certain students.

The texts can further be divided by genre. Text can be informative, instructive, demonstrative, and a combination of text purposes. The length of each text is appropriate for the 2F-level; between 305 and 846 words long. The texts are ideally characterized by a clear structure, according to the syllabus. This entails there is a clear use of headings and signalling words are used to create an understandable message. Finally, the vocabulary of the texts is comparable to words that are common within the public domain or that readers can easily understand through the rest of the text or context.

Concept mapping. Predictive characteristics of the exam texts will be isolated and coded through the use of concept maps as explained by Novak and Cañas (2006). These characteristics will then be coded and counted in order to yield numerical data to allow statistical analyses.

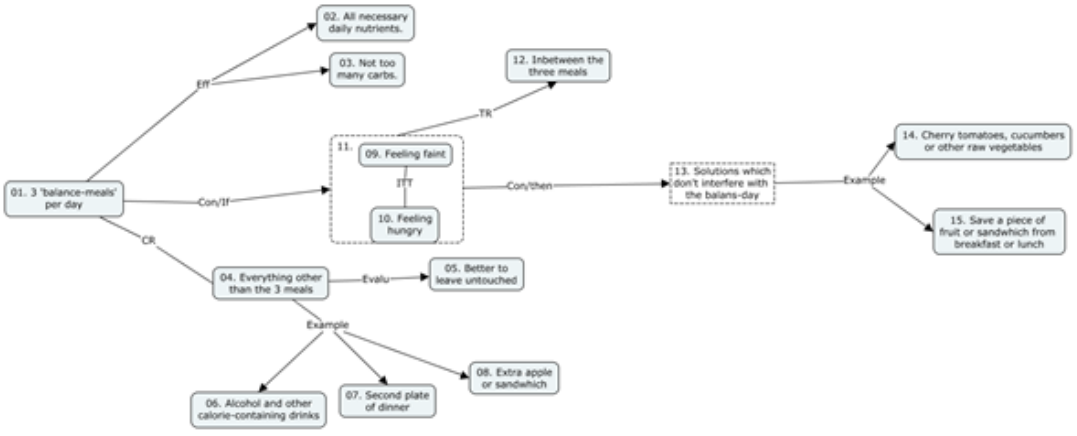

Figure 2. Example of concept map created in this study.

Figure 2 displays a concept map created for this study. This concept map was created with the software tool CmapTools. This tool allows individuals, or teams, to represent complex knowledge in a systematic way (Cañas et al., 2004). Within the concept maps, elements of information are enclosed by a solid or fragmented outline. A solid outline indicates the information is explicitly stated in the text. A dashed outline indicates implicit information, that needs to be inferred by the reader. Each element is given a unique number, this allows for easier transfer of the elements into a database. The elements are connected with lines that represent relations. The nature of this relation is indicated by an abbreviation in the middle of the line.

Predictability of the newly selected characteristics is analysed in addition to the characteristics analysed in the research by Roelofs et al. (2019). In this research a selection of 53 characteristics was analysed. These characteristics could be categorised as follows: theme of text, linguistic characteristics, size of necessary information type of information task, task characteristics related to cognitive burden, target skills, task characteristics related to information-skills, knowledge and access-skills, and characteristics related to item presentation.

Procedure

As mentioned before, Cito provided test meta-data for 128 items, regarding reading comprehension exams of the 2F-level. This involved several parameters, among which p-values and Rirs, and all available test meta-data such as text genre, outcome domain, and year(s) of administration, which were made available for analyses. In addition, Cito provided the texts and accompanying items for coding. The entire process between coding and the statistical analyses can be described in five steps. First, through the use of concept mapping, characteristics related to the necessary information for each item were defined and isolated. Second, the characteristics were coded and transferred into a database, which would allow for further analyses. Third, exploratory analyses were carried out to yield descriptions of the items in terms of the selected coded features. Fourth, in order to find features which show significant associations with p-values and Rirs, product-moment correlations were calculated. This allowed for the fifth and final step: a multiple regression analysis was carried out to analyse the predictive contribution of the selected features to item difficulty (p-value) and item discrimination (Rir) respectively. In this analysis existing features as found by Roelofs et al. (2019) were combined with the newly found features regarding text information.

Defining and isolating characteristics. To define and isolate characteristics it was decided to create concept maps of the necessary information to respond to a particular assessment item. Concept maps can be seen as a schematic representation of both the explicit and implicit information of texts. This representation would then further allow coding of different aspects of these models of information. The concepts maps were initially created in

Microsoft PowerPoint, later they were created using CmapTools. This latter software package proved better suited for the creation of concept maps and the export of the information within the concept maps to software packages for statistical analyses. The structure of the concept maps did not change due to this change in software.

Concept maps exist of information elements (or concepts) which are connected through relations. These relations can be of a different nature. These relations can differ in the type of relation (defining, contrasting, effect, etc) and can differ in explicitness. Examples of different types of relations can be found in literature. Kirsch and Mosenthal (1990) provide a list of semantic-relation categories which was used in order to compare the structure and content of different documents. Several of these categories and their definitions were used when coding relations within the concept maps created for this study, such as: agent, cause, comparison, condition, contrast, goal and temporal. Although examples of types of relations can be found in literature, there was no comprehensive taxonomy of types of relations available for the purpose of this study. Types of relations were added and defined throughout the making of the concept maps and coded after collegial consultancy and agreement. This was a collaborative effort with the project supervisor, who employed a similar concept mapping procedure for reading comprehension exams of the 3F level. Moreover, since the number of texts was limited, the number of relations could have been higher than the number actually found. In total, 23 different types of relations were used.

The information elements consist of information taken from the texts, part of it is to be found almost literally and relates to the text-base, parts of it need to be inferred. The final concept map is always a situation model created by the researcher after interpretation of the text. Following the guidelines of Novak and Cañas (2006) each concept ideally consists of a single element of information, or a cluster of several elements combined in one larger concept. However, this proved to be difficult and not always feasible. Figure 3 shows an item, the necessary source text to respond to the item and the concept map illustrating the relevant information within this text after interpretation. The text and item were translated by the researcher to be more appropriate for the target audience of this paper. As previously discussed, solid lines indicate explicit information and fragmented lines indicate implicit information. Colours were added to further indicate the importance of certain elements and relations. Yellow indicates that the information is related to the information that is directly related to the information that is needed to arrive at the correct response option, purple indicates the information that most likely leads test-takers to the incorrect response options. The correct option to the question is checked.

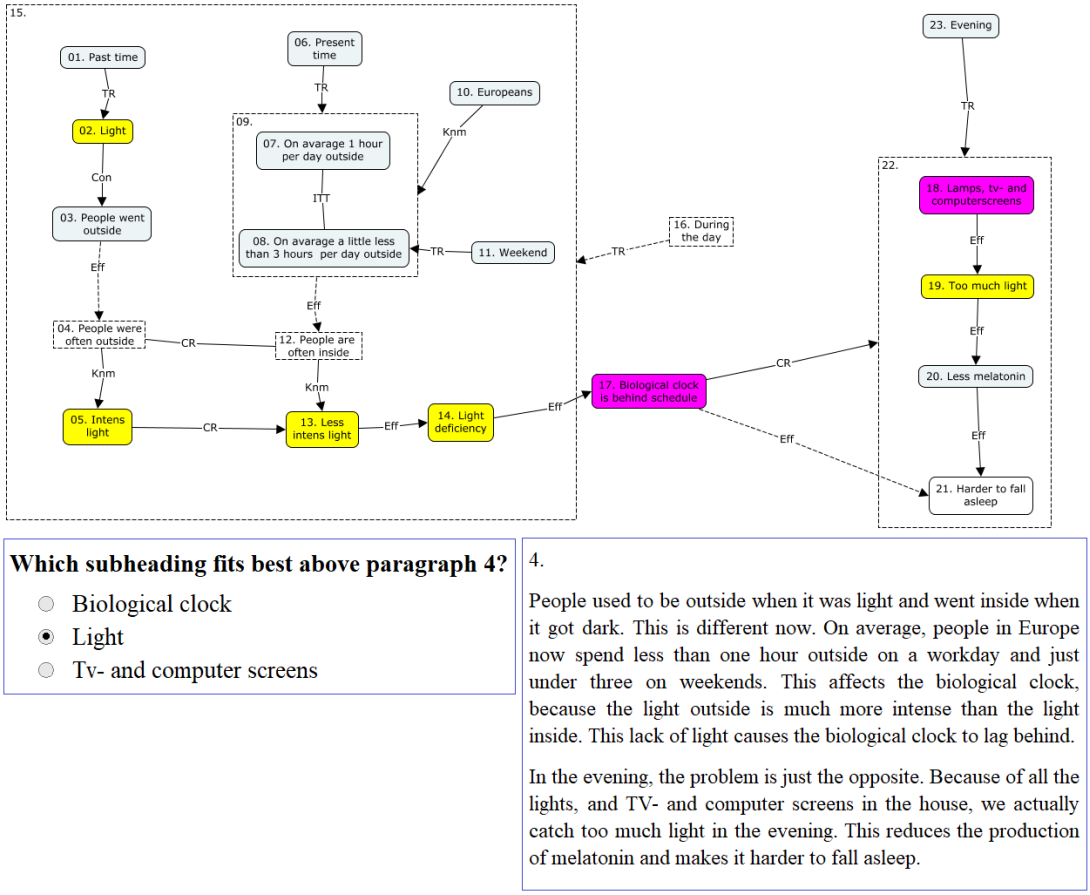

Figure 3. Second example of a concept map created for this study with accompanying necessary text and item

It should be noted that the concept maps are prone to subjectivity in that they are designed by a single researcher who is not an expert on the matter. However, the plausibility of the concept maps was enhanced by means of consultation by the supervisor of this study. In addition, it is expected that the quality of the concept maps shows in the predictive value of its components for item difficulty and discrimination, in addition to the selected characteristics in the research by Roelofs et al. (2019).

Isolating, defining and counting features. Features which became apparent through the construction of concept maps had to be coded to allow for further analyses. The following characteristics were defined and isolated: 1) Types of elements of information 2) types of relations between these elements, 3) implicitness or explicitness of both elements and relations, and 4) whether the information is semantically related to the correct or incorrect response option.

First, the information-elements (concepts) were coded based on the type of information represented by the element. For this purpose an existing taxonomy was used to categorize each element of information. This taxonomy was drawn from T-Scan; a tool for analysing Dutch text

(Pander Maat et al., 2014). This classification system includes 14 different types of nouns and 11 types of adjectives. These adjectives did not allow for differentiation for the direction of the adjective (i.e., positive/negative). It was decided to split up such adjectives in order to analyse whether the direction of adjectives might be related to difficulty. This resulted in a total amount of 15 types of adjectives. All in all, the system includes 29 types of elements of information. The classification system by T-Scan also provided a further classification of the different types of nouns based on the level of concreteness of the information. An overview of all information types, examples and the corresponding level of concreteness is added as Appendix 1.

Second, the 23 different types of relationships were each assigned a number, in no specific order. This allowed to count the number of times a type of relation appeared within a model, in addition to the number of different relations. This data represents the relations a student has to understand in order to correctly respond to the corresponding item correctly. In addition, the coding included the elements which were connected by a particular relationship. For example, an element containing the information "household items" could have exemplary relations to elements containing "vacuum" and "blender". An overview of all types of relations, abbreviations and examples is added as Appendix 2.

Counting a certain number of relations allowed another feature to be coded: the centrality of an element. The centrality of an element is understood as a representation of the layering within the information. This centrality was coded by counting the number of relations attached to a certain type of information-element per item and the number of (strongly) central elements per item. It was determined that a "strongly" central element would have at least four relations attached to it.

For both relations and elements of information it was reported whether the information was explicitly or implicitly present within the text. This allowed to see which items required the test taker to make inferences and the proportion of implicit information of which the information model existed, after interpretation by the researcher. This characteristic of information was coded as a dichotomous variable. In other studies, an ordinal variable was chosen to represent the explicitness of information. A difference would be made between explicit, rephrasing and paraphrasing, and implicit. In this study rephrasing or paraphrasing were considered as explicit information, since the necessary information is printed in the text.

For each relation and information-element it was coded whether the information matched the information within one of the provided response options for an item. A distinction was made between information matching the correct response option, and information matching the incorrect response options. A match between the text and one of the options could refer to both implicit and explicit information. Figure 3 provides an example of the way this data was

coded. The yellow elements are directly related to the correct response option, which in the case of the example is “light”. The same could be done for relations, however this was not relevant for the model presented in Figure 3. Purple elements refer to one of the incorrect response options.

The procedure of isolating, defining and counting characteristic enables us to investigate the first sub-question central to this study, which is: “*What task features of the necessary information to respond to reading comprehension assessment items within a text can be defined and isolated?*”. To provide more clarity into the different task features that were created Table 1 is added. This table contains an overview of the general features, and the different ways they were counted, as they were used for the analysis.

Descriptive analyses. Once the before mentioned features of each information model were coded and counted, a descriptive analysis was performed. To prepare the data for this analysis, the task features of items consisting of several propositions had to be merged. In total this study contains 13 items which consist out of three to five separate tasks. For example, based on the appropriate text the student has to judge for three statements whether the statement is true or false. Since these sub-tasks can refer to separate information models it was decided to create separate models and combine the data.

Table 1:

Overview of general information features that have been defines and used for analysis on their association with item p-vales and Rir-values.

General information features	Relatedness to response options			
	Related to all response options		Related to correct response option	
	Abstract	Implicit	Abstract	Implicit
Types of information elements	x	x	x	x
Types of relations		x		x
Number of information elements	x	x	x	x
Number of different types of information elements		x		x
Number of strongly central information elements		x		x
Number of relations		x		x
Number of different types of relations		x		x

Once the data were prepared a descriptive analysis was conducted. This analysis provides insight into groups of items where a certain characteristic was present or absent. Groups were compared on the mean p-score, mean Rir-score, amounts of certain elements and relations, and the degree of implicitness.

Correlational analyses. The data representing the information features per item were transferred to SPSS for the analyses to find correlations between the information features and the item parameters. The total data set included task features, mean item p-values and mean item Rir-values, in addition to characteristics identified in the study by Roelofs et al. (2019). An overview of these characteristics used in the study by Roelofs, and the correlations with average parameter values, can be found in Appendix 3. As mentioned before, the psychometric data describing the items had been computed based on administration data collected between 2010 and 2018.

Using this correlational analysis the second research question central to this study is investigated, regarding the relations between selected characteristics and item parameters. For this purpose, Pearson's product-moment correlation coefficients were computed.

Prediction of item-parameters through multiple regression analyses. The characteristics that were found to correlate significantly with item-parameters were tested for their predictive contribution through a stepwise multiple regression analyses in SPSS. This analysis used the predictive models established by Roelofs et al. (2019) and added features to these models in an attempt to enhance their predictive ability. With this analysis an answer is given to the third research question of this study.

Results

The focus of this study is the attempt to find features of the information central in reading comprehension exams which contribute to the difficulty and discriminative power of the assessment items. The features added in this study related to different types of elements of information, the relations which connect these elements, the centrality of elements, the degree of implicitness, and the relatedness to any of the provided response options. The difficulty of items is represented by the p-value, whereas Rir-scores indicate the extent of discriminative power of items.

This chapter is divided into three parts. First, descriptive results are provided. These provide insight into the prevalence of item characteristics in the investigated itemset. Second, correlations between the prevalence of characteristics and item parameters are presented. The final part includes results regarding the prediction of item parameters though a multiple regression analysis.

Descriptive analyses: the prevalence of text information features

Table 2 provides different insights into the selected item set, per text, for this study. For each text the number of items related to this text is reported. The p-values and Rir-scores of these items are averaged per text and presented with their standard deviations. In addition, this table provides insight into the amount of information the item-sets per text, on average, refers to. This is expressed in the average number of elements of information and relations involved per item. A notable difference in the amount of information can be seen between text 185 (where the average number of elements of information is 61.50 for relations it is 59.25) and text 17 (where the average number of elements of information is 16 and for relations its 17.25). This means that the items accompanying text 185 refer to a larger amount of information than the item for text 17. These differences between texts can exist due to several factors. Whether or not items require several dichotomous tasks (i.e., evaluation of statements as “true” or “false”) are used or whether the items require information that involves the entire text or just parts of it are examples of such factors. Table 2 provides further information in regard to the explicitness of the information elements and relations per text. The complementary percentage up to 100 then logically refers to implicit information. It can be observed that necessary information for responding to items is generally more often explicit than implicit. However, differences exist in the extent to which necessary information is implicit. For example, items associated with text 101 has more than 90% explicit elements of information and relations, in comparison to text 5 from which the accompanying items refer to about 60% explicit information.

Table 2

Item parameters and descriptive results per text

Text number	Number of items	P-value		Rir-score		Mean N elements per item	Percentage of explicit elements	Mean N of different element-types per item	Mean N relations per item	Percentage of explicit relations	Mean N of different relation-types per item	Mean N of strongly central elements per item
		M	*SD*	*M*	*SD*							
5	4	51.38	11.52	26.69	0.43	23.8	57.9%	6.8	21.3	52.9%	6.5	1.8
17	4	61.00	23.32	26.56	0.48	16.0	70.3%	5.0	17.3	63.8%	5.8	1.8
33	8	58.63	30.51	14.63	0.77	17.3	91.3%	4.6	17.0	83.1%	7.4	1.1
35	4	38.50	17.39	26.75	0.36	25.5	76.5%	4.0	28.0	62.5%	5.5	1.5
38	8	77.69	14.23	30.56	0.40	23.4	89.8%	6.4	21.9	84.6%	6.0	1.6
48	5	59.80	16.52	26.10	0.25	23.6	89.8%	5.4	24.2	85.1%	8.4	1.8
49	6	63.86	23.42	28.86	0.20	33.3	79.0%	7.0	34.5	82.6%	6.7	2.3
64	7	67.57	23.47	24.57	0.37	18.7	89.3%	5.1	16.9	93.2%	5.6	1.7
78	6	71.17	16.59	33.67	0.08	26.8	91.9%	5.3	27.5	87.3%	5.8	2.2
79	6	64.14	22.22	28.06	0.27	24.3	85.6%	6.7	21.0	94.4%	7.5	2.2
87	4	53.25	21.98	36.64	0.14	35.3	72.3%	7.0	32.0	73.4%	8.0	2.8
95	8	79.25	8.96	29.13	0.46	32.3	84.2%	7.5	31.0	90.3%	8.6	1.5
97	4	57.88	10.09	34.94	0.22	41.3	80.6%	8.8	37.8	96.7%	8.5	3.5
100	4	59.06	28.75	26.88	0.29	34.3	81.0%	8.3	29.5	78.0%	7.8	2.3
101	5	53.48	23.02	35.47	0.17	19.0	91.6%	3.6	19.4	99.0%	3.4	1.4
117	4	67.75	21.67	19.50	0.78	25.5	71.6%	6.3	21.3	74.1%	9.0	2.8
124	8	67.31	15.14	39.75	0.27	37.9	79.5%	8.8	36.0	80.2%	10.6	3.3
126	6	62.33	26.37	23.00	0.50	27.3	81.1%	7.2	24.2	92.4%	8.0	2.7
127	8	56.38	16.74	21.33	0.50	40.9	86.5%	10.9	47.3	79.9%	14.4	3.5
156	8	50.61	18.77	31.18	0.22	26.8	69.6%	8.5	24.0	76.0%	9.8	1.5
171	4	50.75	13.67	25.75	0.50	39.3	84.1%	8.5	38.5	81.2%	8.0	4.8
185	4	63.25	37.77	25.69	0.20	61.5	82.1%	10.5	59.3	92.8%	9.3	4.0
187	4	71.97	6.01	25.59	0.24	23.0	82.6%	7.3	22.8	87.9%	7.5	2.0

Table 2 also provides insight into the number of different types of information elements and relations which are used in the information models which the items refer to. A remarkable difference exists between text 101 and text 127. The information models for the necessary information within text 101 contain of a relatively low number of different types of elements (M = 3.6) and types of relations (M = 3.4). Whereas the information models for text 127 contain a relatively large variety of types of information (M = 10.9) and types of relation (M = 14.4). There are several factors likely to be responsible for this difference. The topic of a text, the quantity of the information an item refers to, the interpretation of the researcher and the writing style of the author are all possible factors.

A second descriptive analyses was performed by grouping texts based on the average item difficulty and item discrimination of their accompanying items. These comparisons provide insight into the differences between the information models behind the texts that accompany these items. Two contrasting group comparisons were made: 1) texts with items that have relatively low p-values (p-values between .38 and .53) versus texts that have relatively high p-values (p-values between .67 and .79); 2) texts with items that have relatively low discrimination indexes (Rirs between .14 and .24) versus texts items with relatively high discrimination indexes (Rirs between .33 and .39) and thus differ in the ability to discriminate between capable and non-capable students.

The resulting four groups, each combined of five texts, were compared in terms of their average number of elements and relations used, and the percentage explicit elements and relations. The results in Table 3 show a notable difference between the most difficult and the easiest items. The most difficult items use, on average, less explicit information than the easiest. This difference is likely due to the fact that explicit information is easier to understand than implicit information. For explicit information less pre-existing knowledge and cognitive processes, or so called top-down processes, are needed to come to a coherent situation model. No further notable differences can be observed.

Table 3

Descriptive results for highest and lowest average difficulty and discrimination

Text-groups	Mean N elements Per item	Percentage of explicit elements	Mean N different element-types	Mean N relations per item	Percentage of explicit relations	Mean N different relation-types	Mean N strongly central elements
Lowest P-score	175.9	77.16%	7.0	179.0	69.37%	7.6	2.5
Highest P-score	200.4	85.6%	7.0	193.4	86.04%	7.7	2.1
Lowest Rir-Score	172.4	83.96%	6.8	172.4	84.55%	8.9	2.4
Highest Rir-score	173.0	83.18%	6.7	165.8	87.32%	7.3	2.6

Correlation between prevalence of item features and item parameters values

To identify associations between the defined and isolated text information features on the one hand and the item parameter values on the other, Pearson's correlation coefficients were calculated. The analyses were conducted for all features that were defined and isolated. However, only the significant correlations found most meaningful are presented in this section, due to practical limitations. An overview of all correlations found is added as Appendix 4. First, correlations between the prevalence of specific different types of information-elements and relations on the one hand are reported and the item parameter values on the other hand. Second, correlations between general information features on the one hand and item parameters values on the other hand are reported. These general features include number of information elements, number of central information elements, number of relations, number of different types of relations combined with the type of relatedness with response options, the abstractness and implicitness (implicit or explicit).

Analyses of specific different types of elements and relations. Table 4 shows significant correlations between the number of different types of elements of information and different types of relations per item on the one hand, and the item parameter values on the other. A distinction is made between elements of information containing nouns and those containing adjectives. These variables describe the number of times a type of element or relation was counted within an information model per item. The associations between these variables and the item parameter values (expressed in p-values and Rir-scores) were analysed. In total 28 different types of elements were taken into account. This is one less than described in the method-section due to the fact that the type "measurement" (i.e., Euro, decibel) did not occur

Table 4

Results of correlational analyses between types of information and relations, and item parameter values (N = 128)

Characteristic	Item difficulty (p-value)		Item discrimination (Rir-score)	
	r	*p*	*r*	*p*
Types of elements of information (Nouns)				
Nutrition and care	-.093	.295	**-.187**	.034
Concrete other	**-.180**	.042	.025	.781
Abstract event	-.**199**	.024	-.005	.952
Types of elements of information (Adjectives)				
Specific evaluation (positive)	.093	.298	**-.209**	.018
General evaluation (positive)	**-.210**	.017	.035	.698
Types of relations				
Contrast	-.073	.414	**.176**	.047
Definition	**-.204**	.021	-.010	.912

Note. Significant correlations are in bold

in any concept map. In addition. 22 different types of relations were analysed, which is also one less than previously described. The relation type ‘sequence in random order’ was not observed.

Several significant correlations were found for both item parameter values. Interestingly, all significant correlations between a characteristic and item difficulty are negative. This means that the more frequent these types of information-elements or relations are present within the information model needed to respond to an item the more difficult the item is. There are three types of elements of information that have such a correlation: ‘concrete other’ [r = -.180, p = .042, N = 128], ‘abstract event’ [r = -.199, p = .024, N = 128], and ‘general, positive evaluation’ [r = -.210, p = .017, N = 128]. One type of relation had a significant, and also negative, correlation with item difficulty, thus increasing the difficulty of the item: ‘defining relation’ [r = -.204, p = .021, N =128]. For item discrimination both positive and negative correlations were found. Two types of elements of information were found to have a negative correlation with item discrimination. This means the item discriminates worse between capable and not-capable students, in case of higher prevalence of the following types of information: ‘nutrition and care’ [r = -.187, p = .034, N = 128] and ‘Specific, negative evaluation’ [r = -.209, p = .018, N = 128]. One type of relation was found to have a positive correlation with item discrimination: ‘contrasting relation’ [r = .176, p = .047, N = 128].

All types of information-elements and relations were also analysed under the sub features of being either implicit or explicit, being directly related to the correct options or incorrect options, and possible combinations of these sub features. These results are not included in this table, but can be found in Appendix 4. This decision was made because these correlations are considered to not provide insights contributing to the conclusions drawn within the discussion-section. These limitations are elaborated upon within the discussion-section.

Analyses of general information features. Table 5 shows significant Pearson’s correlation coefficients between general information features and the item parameter values. These general information features are grouped into six categories. First is the total number of information elements. These total numbers have been broken down into further combinations of features (see Table 1 in the ‘procedure’ section for further explanation), such as elements or relations directly related to the correct response, and implicit elements and relations. Four features were found with a significant negative correlation with item difficulty: the total number of information elements per item [r = -.183, p = 0.038, N = 128], the number of elements directly related to the correct response option per item [r = -.306, p = .000, N = 128], the number of explicit elements directly related to the correct response option [r = -.309, p = .000, N = 128], and the total number of implicit information elements per item [r = -.227, p = .010, N = 128].

Table 5

Results of correlational analyses between pooled characteristic, and item parameter values (N = 128)

Characteristic	Item difficulty (p-value)		Item discrimination (Rir-score)	
	r	*p*	*r*	*p*
Number of information elements				
Total number of elements per item	**-.183***	.038	.036	.689
Number of elements related to the correct response option	**-.306****	.000	-.102	.253
Number of explicit elements related to the correct response option	**-.309****	.000	-.123	.167
Number of implicit elements per item	**-.227****	.010	.102	.254
Number of relations				
Number of relations related to the correct response option per item	**-.257****	.003	-.042	.639
Number of explicit relations related to the correct response option per item	**-.221***	.012	-.023	.794
Number of implicit relations related to the correct response option per item	**-.215***	.015	-.071	.427
Proportion				
Proportion of explicit elements per item	**.288****	.001	.021	.812
Number of different relations				
Number of different relations between elements per item	**-.360****	.000	-.058	.513
Number of different explicit relations between necessary elements for the correct response option per item	**-.304****	.000	-.063	.479
Number of different implicit relations between elements per item	**-.245****	.005	-.024	.787
Number of different implicit relations between necessary elements for the correct response option per item	**-.250****	.004	.003	.970
Centrality of elements				
Number of strongly central elements related to the correct response option per item (at least 4x per type)	**-.230****	.009	-.014	.875
Number of strongly central elements per item (at least 4 per type)	**-.239****	.007	-.015	.869
Abstract or concrete				
Number of abstract elements per item	**-.191***	.030	.017	.845
Number of explicit abstract elements per item	**-.174***	.050	-.009	.919
Number of concrete elements related to the correct response option per item	**-.314****	.000	.085	.341
Number of explicit concrete-elements related to the correct response per item	**-.301****	.001	.050	.577

Note. Significant correlations are in bold.

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed

Second, the number of relations were counted and analysed. Three features showed significant negative relations with item difficulty. These are: the total number of relations directly related to the correct response option [r = -257, p = .003, N = 128], the number of explicit relations directly related to the correct response option [r = -.221, p = .012, N = 128] and the number of implicit relations directly related to the correct response option [r= -.215, p = .015, N =128].

Third, the table shows results regarding the proportions of elements, or relations, within an information model which are explicitly present within the corresponding text. Out of these features one has a significant correlation with an item parameter. The proportion of explicit elements per item has a positive relation with item difficulty [r = .288, *p* = .001, N = 128]. This means that when more elements are explicitly present within a text the accompanying items tend to be easier.

Fourth, results regarding the number of different types of relations showed significant correlations with item difficulty for four of these features. All correlations were negative: the total number of different types of relations between elements per item [r = -.360, *p* = .000, N = 128], the number of different types of explicit relations between necessary elements for the correct response option per item [r = -.304, *p* = .000, N = 128], the number of different types of implicit relations per item [r = -.245, *p* = .005, N = 128] and the number of different types of implicit relations between necessary elements for the correct response option per item [r = -250, *p* = .004, N = 128].

Fifth are features representing the centrality of elements within the information model behind the textual information necessary for responding to the item. This centrality was assessed by the number of relations connecting a particular element to another. An element was considered central when at least 4 connections with other elements were present. Two features representing centrality showed significant, and negative, correlations with item difficulty: the number of strongly central elements directly related to the correct response option (at least 4x per type) [r = -.230, *p* = .009, N = 128], and the number of strongly central elements per item (at least 4 per type) [r = -.239, *p* = .007, N = 128].

It was additionally analysed whether certain specific types of elements showed a stronger correlation than others if these took a central position within the information model. We found significant relations for the number of relations connected to a certain type of element when this directly related to the correct response option. These types are: ‘persons’ [r = -.301, *p* = .001, N = 128], ‘places’ [r = -.217, *p* = .014, N = 128], ‘abstract substances’ [r = -.181, *p* = .001, N = 128], ‘places used as characteristic of other elements’ [r = -.279, *p* = .001, N = 128] and ‘general evaluation (positive)’ [r = -.221, *p* = .012, N = 128].

Finally, based on the different types of information-elements by the software program T-Scan, types of elements were grouped into three different levels: abstract, mostly concrete, and strictly concrete elements. This was only done for the types of nouns. These groups of elements were than analysed. Four of these groups showed significant negative correlations with item difficulty: the number of abstract elements per item [r = -.191, *p* = .030, N = 128], the number of explicit abstract-elements per item [r = -.174, *p* = .050, N = 128], the number of

concrete elements related to the correct response option per item [r = -.314, *p* = .000, N = 128], and the number of explicit concrete-elements related to the correct response option per item [r = -.301, *p* = .001, N = 128].

Noteworthy is the fact that all significant correlations listed above, except for the proportion of explicit elements per item, are negative correlations with item difficulty, which means that we did not find information elements that made items easier. In addition, only limited significant correlations were found between information features and the discriminative ability of items. The significant correlations can be found in Appendix 4, but are not described in this section since these correlations are considered to not provide insights contributing to the conclusions

Prediction of item parameter values with multiple regression analyses

The study by Roelofs et al. (2019) yielded a prediction-model for both item parameters using a preliminary set of literature-based features, and using features that showed to have a significant correlation with the item parameters. This study, which can be understood as a follow-up study, included additional features in order to improve the predictive abilities of the models by Roelofs et al. (2019). This was done by adding the new text information features that show significant correlations with item parameter values in a stepwise multiple regression analysis. First the prediction model for item difficulty is reported, followed by the prediction model for item discrimination.

Table 6 shows the results of the multiple regression analysis for prediction of the p-value of an item. In this table the unstandardized beta (B) and its standard error is given. In addition to the standardized regression weights (beta), and their respective t-values and significance levels. The first three predictive characteristics are taken from the study by Roelofs et al. (2019). Together these three characteristic made up the entire prediction model as presented by Roelofs et al. (2019) and have a total (adjusted) explained variance of 60 percent. The predictive characteristic used in this model are: 1) the type-token ratio (different words/amount of words), 2) the number of inferences that have to be made, and 3) whether or not the item requires an additional skill. By conducting a backwards multiple regression analyses, two additional predictive characteristics were found. This new model has a total explained variance of 61 percent ($F(5, 122) = 40.70$, $p = .000$, $R^2 = .63$, $R^2_{Adjusted} = .61$).

Table 6

Results of multiple regression analyses: prediction of item difficulty (p-value) with five predictive characteristics (N = 128)

Predictive characteristic	Unstandardized coefficients		Standardized Coefficient		
	B	*SE B*	*β*	*t*	*p*
(Constant)	116.06	9.70		11.96	.000
Number of inferences to be made	-12.13	1.00	-.71	-12.09	.000
Item requires additional access skill	-13.53	2.89	-.26	-4.70	.000
Type-token ratio (amount of different words/words/number of words (tokens))	-72.61	19.37	-.21	-3.75	.000
Total number of elements	0.24	0.09	.27	2.53	.013
Number of centralised elements (at least 4 relations per type)	-3.81	1.28	-.32	-2.98	.003

Adjusted R^2: .61

This new model used five characteristics to explain 61 percent of the variance in p-values for the 128 items central in this study. The most powerful predictive characteristic is the number of inferences to be made per item (beta = -.71). This means that the more frequently inferences need to be made the more difficult the item becomes, or in other words: the p-value decreases. Second, whether or not the item requires an additional skill (beta = -.26). Such skills can be working with ratios or the use of difficult words within the question or provided response options. If an item requires such an additional access skill the item becomes more difficult. Third is the type-token ratio (beta = -.21), which is a representation of the lexical richness of a text. This means that the more frequently different words make up a text related to an item, the more difficult the item becomes. Fourth is the total number of elements of an information model which an item refers to. This is the only predictive characteristics with positive association with item difficulty (beta = .27). Meaning that an item becomes less difficult if the number of elements used in the information model becomes higher, when the other features have been taken into account. Finally, the number of strongly centralised elements (at least 4 relations per type) within the information model is negatively associated with item difficulty (beta = -.31). Meaning if the items require the use of more strongly centralised information elements the item becomes more difficult.

A second prediction model was created in a similar fashion for item discrimination. Table 7 shows the corresponding results. The first five predictive characteristics reported are also used in the predictive model yielded by Roelofs et al. (2019). This original model used a total of five predictive characteristics and explains 29 percent of variance in item Rir-scores. This new study adds two variables, resulting in a new model. This new model explains 36 percent of the variance in item discrimination values ($F(7, 120) = 11.28$ $p = .000$, $R^2 = .40$, $R^2_{Adjusted} = .36$).

This new predictive model is thus made up out of seven predictive characteristics. First, it appears that items accompanying a text with the topic 'traffic and transport' discriminate better between students (beta = .31). Second, if the presentation of an item is characterized by the correct response option containing the most complete and correct response option provided, based on the presented textual information, the item discriminatory value is higher (beta = .29). Third, two target skills from the 2F assessment matrix are added. Items characterized by the target skills 'relating text parts (introduction, core, conclusion) and texts' have a lesser discriminatory-ability (beta = -.17), whereas items referring to the target-skill 'relating between textual information and common knowledge' appear to discriminate better (beta = .23). The fifth characteristic, and last characteristic shared with the model by Roelofs et al. (2019), is whether the item requires test-takers to retrieve the social-communicative meaning of the text or text-part. Items characterized by this tend discriminate worse (beta = -.18). Sixth, this new study shows that if the information model for an item contains more explicit relations which are directly related to the correct response option, the item discriminates better (beta = . 25). Finally, if more elements of the type 'Non-directly observable characteristics', which are directly related to the correct response option, are present within the information model, the items' ability to discriminate becomes less (beta = -.18).

Table 7

Results of multiple regression analyses: prediction of item discrimination (Rir-score) with seven predictive characteristics (N = 128)

Predictive characteristic	Unstandardized coefficients		Standardized Coefficient		
	B	*SE B*	*β*	*t*	*p*
(Constant)	20.30	2.00		10.16	.000
Text features					
Topic of text: 'traffic and transport'	13.86	3.20	.31	4.33	.000
Presentation features					
Correct response option contains most complete and correct answer	8.37	2.11	.29	3.96	.000
Task features					
Target skill: 'relating text parts and texts'	-6.85	2.87	-.17	-2.39	.018
Target skill: 'relating between textual information and common knowledge'	5.92	1.91	.23	3.09	.002
Underlying information literacy					
Retrieve social-communicative meaning	-5.58	2.28	-.18	-2.45	.016
Information features					
N type of relation: 'Contrast' if explicit and directly related to correct response option	6.13	1.79	.25	3.42	.001
N type of element: 'Non-directly observable characteristics' if directly related to the correct response option	-2.58	1.08	-.18	-2.40	.018
Adjusted R^2: .36					

Conclusions and Discussion

The focus of this study was the attempt to isolate and define features, related to the information necessary for responding to items within a reading comprehension exam, which could possibly explain and predict variance in values for item difficulty and item discrimination. Concept maps were created to represent the information model which an item refers to. Through this process several information features were defined and isolated. A regression analyses was conducted to find correlations between the prevalence of the before mentioned features and the item parameter values. In addition, a multiple regression analyses was conducted to predict these item parameter values. The findings of this study have the potential to stimulate and improve the accuracy of the assessment of reading comprehension. In addition, further development of these findings and methods has the potential to reduce expenses of pre-testing, improve understanding of reading comprehension as a target skill, and to form a basis for systematic design formats. In this section an answer is formulated to the research questions. Furthermore, the limitations of this study are discussed and recommendations for further research are given.

The first research question is: *What task features of the necessary information to respond to reading comprehension assessment items within a text can be defined and isolated?* Sub-questions were created differentiating in focus on elements of information, relations between these elements, and the extent to which these elements and relations were explicitly or implicitly present within the text. In total, 477 features were defined, isolated and analysed. The majority of this large number exist of different types of information-elements and types of relations. These different types can further be specified based on whether they relate directly to the information within the correct response option or not. In addition, different types could be explicitly present within the provided text or implicitly. These specifications of features were also combined. The rest of the defined and isolated features are made up out of different ways to count the different types of elements and relations. For example, ‘the total number of explicit elements that are directly related to the correct response option per item’ or the ‘total number of different relations per item’. Table 1, which is added to the method-section of this paper, provides an overview of the general information features which were defined and isolated in this study.

The second sub-question is: *To what extent are the defined and isolated task features related to item difficulty and item discrimination?* The correlational analyses showed many significant relations, as can be seen in Appendix 4. Following is the discussion of the task

features found to statistically correlate with item difficulty, followed by the task features found to correlate with item discrimination.

Item difficulty. Two task features related to elements of information show interesting significant correlation with item difficulty. The 'total number of information elements per item' and the 'the number of implicit elements per item' both have negative correlations with item p-values, meaning the items become more difficult. The total number of elements can be understood as one of the ways this study tried to numerically represent the amount of information that has to be understood by a student in order to respond to an item correctly. As expected, and as supported by literature, the more information a student has to process, or make sense of, the more difficult it becomes to respond to the item correctly. The second interesting characteristic, the number of implicit elements, can be an indication of the fact that reading comprehension becomes more difficult if the students have to make inferences to create a complete mental model of the information. Several studies, including the study by Roelofs et al. (2019), find the number of inferences to be made to contribute to the item becoming more difficult.

When it comes to the number of relations within an information model, we see that only variables related to 'the number of relations which are directly related to the correct response option' have a significant relation with item difficulty. Not only 'the total number of relations related to the correct response option', but also 'the number of explicit relations directly related to the correct response option' and 'the number of implicit relations related to the correct response option' have a significant negative relation with item difficulty. These results are surprising and not in line with expectations based on literature. The expectation was that more overlap between the information referred to by the correct response option and the information within the overall text referred to by the item would positively relate to item difficulty, making the item easier. This was also expected by Rupp et al., (2001), however no significant relation was found by this study between the lexical overlap of the correct response option and the text. A significant relation was however found by Rupp et al., (2001) between the number of possible incorrect response options and item difficulty. This means that a multiple-choice item becomes more difficult if the incorrect response options contain information which overlaps with the information within the text. These results contradict the findings of this study central to this paper for two reasons. First, in this study no significant corelations were found between the prevalence of types of information-elements or relations which directly relate (or overlap) with an incorrect response option. Second, significant negative correlations were found between the number of relations directly related to the correct response option. For these findings to be inline with Rupp et al. (2001), and other literature, the

relations would have to be positive; making the items easier. The reason for this unusual finding is potentially the relatively low amount of overlap that exists between the information model and the provided response options, if there is any at all. A low number of counts could mean that there is insufficient data to detect the expected effects. In addition, a low count means that the data is more easily affected by personal interpretation and mistakes.

A more promising find is the positive correlation between item difficulty values and the proportion of explicit elements per item. In other words, this refers to the extent of which the information model which a student has to understand is explicitly present in the written text. This finding is in line with previous findings in literature, for example by Roelofs et al. (2019). In this study the number of inferences to be made per item was found to be contributing most to the prediction of item difficulty and had a significant negative correlation with p-values. The number of inferences to be made can be seen as a similar feature as the proportion of explicit information. These are similar because if the information is completely explicit, then no inferences have to be made in order to understand the information. This finding demonstrates the process students have to perform when understanding the literal content of a text by creating a mental representation, or situation model. The information necessary to respond to an item correctly is partly made up through top-down processes, meaning its derived from pre-existing knowledge, and partly from the information in the text. If less pre-existing knowledge or cognitive processes are required, the understanding of a text, and corresponding items, become easier.

Another feature found to contribute to making items more difficult is ‘the number of different relations’ within the information model referred to by an item. This feature can be seen as a representation of the propositional complexity of a text in that it enhances the number of propositions to be processed in order to understand the information. The connection between propositional complexity and item difficulty is found to be significant in several studies and is called beyond controversy by Sonnleitner (2008). The research by Roelofs et al. did not analyse an item characteristic which represents the propositional complexity of the information in a text, but did recommend analysing such a characteristic in future research.

The final group of features found to have a significant correlation with values of item difficulty is related to the number of central elements within an information model. This characteristic can be seen as a representation of the layers of which the textual information, referred to by an item, exists. The layering of information was suggested for further research as a possible contributor to item difficulty by Roelofs et al. (2019). The number of relations connected to a certain type of element can be seen as an indication of which elements take a central position within the information model. The feature ‘the number of strongly central

elements per item (at least 4 per type)' was found to have a significant negative relation with item difficulty. However, it is difficult to theorize the working behind this finding based on literature. It could be that a relatively large number of strongly central elements indicates a more intricate situation model necessary to respond to an item correctly. This could require more cognitive processes which then logically makes an item more difficult. On the contrary, strongly centralized items could also indicate a relatively clear structure within the situation model. This could mean that the situation model is actually easier to comprehend, thus a higher item difficulty value is expected.

Other significant corelations related to centrality were found, however it is difficult to draw conclusions upon these findings. The number of relations related to different specific types of elements which are directly related to the correct response option showed some significant relations, for example with the types 'persons' and 'places'. However, it is difficult to explain why these types could be more challenging, if taking a central position in the model, than others based on literature. In addition, since only relatively few elements relate to the correct response option per item this data is easily influenced by mistakes, personal interpretation and inflation.

Item discrimination. Only limited significant correlations were found between features of the information within a text and item discrimination (Rir-values). The significant correlations that were found form no bases to draw conclusions upon, when it comes to determining what influences the variance in Rir-score of an item. This is because none of the findings are in line with previous findings in literature and the count of these elements is relatively low. However, this is not surprising. Although Roelofs et al. (2019) did find several significant correlations and created a predictive model, the explained variance for this model was much lower than the model for item difficulty. In addition, limited research findings exist for assessment item features which explain item discrimination. Furthermore, previous research findings which do exist are not related to the information central of the 2F reading exam. For example, Buck et al. (1997) found that making inferences in combination with a heavy informational load contributes to item difficulty. Making inferences and a heavy informational load are features only to a limited extent of the 2F exam according to syllabus of this examination.

Furthermore, these findings could be limited by the format of the exam. Since the 2F examination is a multiple-choice exam, the construct of reading comprehension is reduced strongly. This is also evident in the average Rir-scores per text, which does not reach higher than .40. This could have had a limiting effect on the possibility of finding characteristics that could predict item discrimination.

Prediction models. The last sub-question of this research is: *To what extent do the selected task features predict item difficulty and discrimination in addition to the features selected in the previous research by Roelofs et al. (2019)?* Although explained variance for both models was enhanced, questions can be raised whether these models can contribute to the systematic prediction of item difficulty and discrimination.

The predictive model for item difficulty is able to explain one additional percent more than the model by Roelofs et al. (2019), by adding two predictive characteristics. These characteristics are 'the total number of elements per item' and 'the number of strongly centralised elements (at least 4 relations per type)'. Although both these characteristics have the potential to contribute to item difficulty it is difficult to say, based on this study, whether these characteristics will always accumulate to a stronger predictive model. This is mainly due to the fact that these characteristics are potentially under the influence of mistakes and personal reference of the researcher. Although the information model-design was discussed with an expert supervisor, it is still possible that these characteristics form an inaccurate or non-inclusive representation of the actual propositional complexity or layering of each text. The number of elements is seen as an indication of propositional complexity, as priorly described. The number of central elements is expected to be related to the layering of information within a text. These shortcomings of this research, in addition to the minimal improvement of the predictive model, make it difficult to conclude that this study has actually resulted in the creation of a better predictive model.

The same can be said in regard to the predictive model for item discrimination. This model improved the explained variance by seven percent. This is due to the addition of the prevalence of one specific type of information element which is directly related to the correct response option, and one types of relation if explicit and also directly related to the correct response option. This find is promising in the sense that certain specific types of information can contribute to the prediction of item discrimination. Especially since limited research exist on assessment of item features which influence this item parameter. However, it should be noted that the added features are, as priorly discussed, not inline with expectations based on literature. In addition, these features are also possibly subject to the fact that the information models, from which these information features were derived, were created by a single researcher.

Limitations and suggestions for further research

The previously described reasons why the extent to which conclusions can be drawn is limited, form the majority of the limitations in this study. In other words, the fact that the majority of the study, specifically the creation of the information models, was conducted by a

single researcher raises questions about the validity of the findings. A single person is more likely to interpret the information through a personal lens of knowledge and experience. It is thus possible that the information models created of the texts are not concurrent with the situation model a student would create when trying to understand a text during examination. In addition, using a single person to find characteristics makes the research prone to mistakes, which could also have resulted in false representations of the actual information within a text. For this research it would thus have been recommended to reach a consensus concept map, drawn after combining the separate concept maps of two or more individuals, to get a more reliable concept map. However, due to time and practical constraints of this study this was not possible. For future research it would thus be advised to have the process of finding and isolating characteristic done by several researchers. This could prevent personal interpretations of the information and ensure consistency in the creation of the database. In addition, the use of several researchers would further benefit the definitions and descriptions of the types of relations and elements. For this study the definitions of the different relations were discussed with expert supervisors, and the types of elements were derived from a software tool based on research. However, the experience of this study indicates that a more elaborate legenda of relation- and element types can be created to cover the information better.

A second limitation is related to the way the information features were counted. In this study the main set of features exist of variables which express the prevalence of a certain type of information element or relation. Most of these significant correlations which were found, using this set, are negatively related to item difficulty. This means, in other words, that when the amount of information increases the item becomes more difficult. This seems logical, however, for certain features this is not the case. These include: ‘the number of elements directly related to the correct response option’, ‘the number of explicit elements directly related to the correct response option’, ‘the number of concrete elements directly related to the correct item’ and ‘the number of explicit concrete-elements directly related to the correct response option per item. It was expected that explicit information, concrete information, and overlap between the situation model and correct response option would make an item easier. It would be interesting to see if these findings would be the same if all information models were of a similar size. Perhaps the prevalence of certain features would yield different results then.

A third limitation is the relatively small selection of texts and items. Out of a total 192 text 23 were used in this study. These 23 texts were accompanied by 128 items, out of a total 1032. Although it was taken into account that these texts represent a varied spread in average p-value and Rir-score, it could be that there are other characteristic, such as types of elements or relations, which are not taken into account in this study due to the selection of these texts.

Further research would benefit from a larger selection of texts. It would be interesting to see if this method of analysing the information within reading comprehension texts can be applied to different levels of language proficiency. In addition, the assessment central in this study only uses multiple choice items, which leads to a limited assessment of reading comprehension. It would be interesting to see if assessments with different item-types lead to similar findings.

Finally, the multiple regression analyses used in this study is likely to have limitations in order to form a prediction model. It is likely to assume that some of the variables in these models have a moderating effect which the analyses conducted for this study did not take into account. For example, 'the number of inferences to be made' could have a moderating effect on 'the number of implicit information elements'. Or a certain text-topic could be prone to contain more information elements of a certain type than other topics. In addition, notable differences were observed between texts, as can be seen in Table 2. Given these differences exist, it seems that there is a non-negligible text-specific variance, which raises the question of whether a multilevel analyses would have been a more appropriate choice than the ordinary least squares method (OLS) used in this study. This stems from the possibility that the text to which a given item relates may have an effect on the difficulty or discriminatory ability of an item. Not taking this into account in the regression analysis could result in an underestimation of the standard errors and yield substantive blind spots. The significance of the text-level variance, in regard to item p-values and Rir-scores, was however analysed by using a one-way analysis of variance, Appendix 5. The results show no significant variance between item p-values, but a significant difference was found for item Rir-scores. However, even if no significant difference would have been found for both parameters, it can not be guaranteed that a multilevel analyses would yield the same results as were found in this study. It is thus suggested that multilevel analysis are performed in future research. These future analyses should take text-level variance into account, in addition to other potential moderating effects between item- and text-features. Such an analyses has the potential to better account for the complex structure of the data.

Practical value of this study

The information central in the reading comprehension exams of the 2F level for Dutch proficiency had not been classified to this extent. This study provides elaborate insight into the different elements and relations that make up the information within the text. In addition, insight is provided into the extent this information is explicitly present in the text and the extent to which it directly relates to the provided response options. This new information can be used to improve upon the existing item bank from Cito, since it allows a more systematic way of exposing errors within items and texts itself. In addition, the creation of information models

could serve a purpose during the creation of new items. By creating items based on the information models the items could potentially better relate to the situation model that is formed when understanding a text.

The creation of information models can also be used to better align texts with corresponding difficulty levels. In order to do so information models would have to be created for texts central in the 1F, 3F and 4F examinations. Information models for the 3F exams were created to alongside with this study. By comparing these models with the 2F models a better understanding of what makes text more difficult can be created.

Finally, the value of this study exists mainly in it being an indication that characteristic of the information within a text contribute to item difficulty, and potentially also item discrimination. As was expected in previous research. The knowledge derived from this study can potentially contribute to further and more elaborate research into this topic. In addition, the methods used in this study elaborate upon a way to schematically visualize situation models. If further developed, a successful set of predictive characteristics can serve many benefits when it comes to the assessment of reading comprehension, and potentially other target skills as well. Some of these benefits are an accurate assessment of test quality, a reduction of the expenses related to pre-testing, more insight into reading comprehension as a target skill and the creation of systematic design formats for test items.

Conclusion

This current study was conducted to gather knowledge into characteristics of the reading comprehension exams for the 2F Dutch proficiency level which contribute to variance in item difficulty and item discrimination. The focus was on characteristics related to the information within the texts used within this examination, as was suggested by previous research. In order to gather this insight the following research was answered:

Is it possible to define and isolate task features, related to the information within in a text necessary to respond to items within reading comprehension exams, which are related to item difficulty and discrimination?

To answer this question concept models were created which are a representation of the information within each text. Through these models characteristics were isolated and defined, to further be analysed for their potential contribution.

Several characteristics were found which contributed to item difficulty. Notable characteristics which correlated negatively with item difficulty include: ‘the total number of elements per item’, ‘the number of implicit elements per item’, ‘the number of different

relations between elements per item', 'the number of implicit relations between elements per item' and 'the number of strongly central elements necessary for the correct response option per item (at least 4x per type)'. The proportion of explicit elements per item was found to have a positive significant relation with item difficulty.

Finally, limited significant correlations were found between characteristics of the information and item discrimination. These characters can be described as types of relation or elements which were either directly related to one of the response options provided, or which were implicitly and explicitly present in the text.

This study and the knowledge that comes with it can be an indication that the information in a text influences item parameter values of the items which accompany this text. Further development of this method and knowledge can contribute to better prediction of variance in item parameters. With this better prediction comes the possibility to improve upon the assessment of reading comprehension.

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Appendix

Appendix 1: List of all types of information-elements and descriptions as provided by T-Scan (Pander Maat et al., 2014)

Type of element of information	Examples	Description
Nouns		
Persons	*Teacher, J. van den Bergh*	Strict and broadly concrete
Plants and animals	*Sparrow, oak*	Strict and broadly concrete
Utensils	*Chair, loom*	Strict and broadly concrete
Concrete substances	*Mud, curry*	Strict and broadly concrete
Nutrition and care	*Milk, cigarette, effervescent tablet*	Strict and broadly concrete
Concrete other	*Gallbladder, volcano*	Strict and broadly concrete
Concrete happening	*Pat, breathe*	Strict and broadly concrete
Place	*Amsterdam, living room*	Broadly concrete
Time	*Holiday, period*	Broadly concrete
Measurement	*Euro, dB*	Broadly concrete
Abstract substance	*Phosphorus, nuclear fuel*	Abstract
Abstract happening	*Crisis, wage cut*	Abstract
Organisation	*Union, ING*	Abstract
Abstract other	*Christianity, motto*	Abstract
Adjectives		
Directly observable characteristics of persons	*Pale, dwarfish*	
Emotional characteristics and social behaviours	*Offended, gullible*	
Directly observable features of things	*Flannel, yellow*	
Non-directly observable characteristics	*Tar-poor, germ-free*	
Time	*Passing, Fridays*	
Place	*Domestic, over there*	
Specific evaluation (negative)	*Noisy*	
Specific evaluation (positive)	*Indestructible*	
General evaluation (positive)	*Nice*	
General evaluation positive	*Reprehensible*	
General evaluation without direction	*Significant*	
Epistemic evaluation (positive)	*Valid*	

Epistemic evaluation (negative)	*Nonsensical*	
Related (non-evaluative) abstract adjectives,	*Related, attentively*	
Undefined	*Loadable, busy, narrow*	

Appendix 2: List of all relations, abbreviations and descriptions

Different types of relations	**Abbreviations**	**Description and examples (Words between parenthesis indicate an element of information within a model)**
Actor	Actor	Indicates the involvement of a person or agency in a process or action. - *Example:* The "judicial review" is carried out by the "judge" and "privacy committee". The judge and commission are the actors.
Source	B	This indicates where certain information comes from, without judging the reliability or quality of that information / source. This is the difference with BOB where this judgment (valid or not) is given. - *Example:* "Generation Y" is called "And / and generation" by J. van den Bergh. J. van den Bergh is the source.
Reference	BOB	This relation concerns information about the source of an assertion or outcome, and the quality of that source. The information goes further than just stating who / what provided the information. The writer must have added this information element (the source) with the intention of validating the associated information. Whether this succeeds or not according to scientific criteria does not apply; it is about the intention of the writer. - *Example:* 'J. van den Bergh' is de auteur van 'de bestseller How cool brands stay hot'. The second element validates why the author is included in the text
Conditional / if-then	Con/Als & Con/Dan	If / Then relationship corresponds to a conditional relationship. If 'element A' happens, 'element B' follows. This type of relationship consists of two arrows (1x If, 1x then) and connects 3 elements. This differs from the conditional relationship that connects 2 elements with 1 arrow. - *Example:* With regard to the "costs for suspension of vehicle"; if "the car is not older than 15 years", the owner of the car pays "the normal rate".
Conclusions	Conc	A logical inference (according to text) from another element or group of elements. - *Example:* The "urgency for damage avoidance is great", so "more is needed to farm nature-inclusive on a larger scale".
Contrast	CR:	The relationship indicates that there is a contradiction between two information elements or propositions. The contradiction must have a meaning with regard to the information in the text and its understanding. - *Example:* Captive dolphins "rarely make friends", which is in contrast with a wild dolphin who is "living in a close-knit group."
Definition	Def:	A definition of concept is given in the text. The definition is exclusive. Unlike *Knm*, this defines only part of the information element. - *Example:* 'Flow' means 'to lose oneself in work'.
Effect	Eff:	One information element has an effect, namely the information element with which it is connected. - *Example:* "Getting meaning from your work" and "Finding a challenge in your work" lead to a "feeling of happiness".

Evaluative	Evalu	An evaluation is made about another information element, or relationship between those elements. For example, something is good or bad in the eyes of a source. - *Example*: "Working until noon without food" is a "good sign" according to the author to determine if you have found a dream job.
Characteristic	Knm:	Defining and distinguishing features. Relationship between an information element and the properties of this information element. Concrete concepts (colour, length); more abstract (not directly observable: validity, reliability) etc. - *Example:* "Features of a" dolphin "are" a streamlined body "and" can reach up to 200m. deep dive ".
Mean-end	MD:	Just like effect-relation, it has a clear sequence in time. The difference is that here there must be an overlap between the causes (problem) and the solution to it. It stems from a human motive. - *Example:* In some countries "such legislation" is valid to ensure that "dolphinariums no longer occur".
Random ordering	SeqW:	Relationship indicates that elements succeed each other in chronological order without there being a causal relationship or logic: - *Example:* order of traffic lights
Logical ordering	SeqL	Relationship indicates that elements succeed each other in chronological order without there being a causal relationship. These can be ordered in a logical sense. - *E*xample: A, B, C, D.
Type	Srt	List of similar information items without further meaning. Individual items are not closely related to each other. It may be the case that the elements can fall under one above concept, but this is not specified in the text. - *Example:* The government's "Zoning Plans" are "Protect Valuable Areas" and "Protect Valuable Docks and Cityscapes".
Example	VB	The information element is an example to clarify or illustrate another information element - *Example:* “fish" such as: "goldfish" and "carp".
Temporal	TR	Determines the time of the information element. Historical period or contrast in time with another moment - *Example:* Difference in way of working between "before" and "now".
Functional	FR	The function of an information element is described. It does not say that the function has come into effect (this would probably be an effect or means-end). - *Example*: The "volume knob" is used to make the radio "louder or quieter".
Argument	Arg	An element, or group of elements, can is used to validate a different element. - *Example:* the heating of the earth is an argument for ‘environmental policy’
Contrasting argument	CRArg	Relationship exists between two elements that are used as an argument. The second element shows the opposite or incorrectness of the first element. - *Example,* one argument against basic income is that it "causes laziness", but it has been found that "no less work is being done".
Result	Res	The second element is the result of the first. - *Example*: a survey and its results.
Explanation	Toe	Elements succeed each other and describe a process.

		- *Example:* Protecting valuable areas goes as follows: "Farmer acts in accordance with the rules " > " Costs are for the farmer " > " Compensation of the farmer ".
In addition to	Itt	The author connects elements by summing them up for a particular reason which isn't defined by any other type: - *Example:* "noise' in addition to 'harm to birds' are reason against the installation of windmills.
Comparison	Verg.	The author makes a comparison between elements. This can include similarities and differences: - *Example*: "apples" and 'pears' are both fruits

Appendix 3: Correlations between prevalence of text characteristics, task characteristics, access characteristics. and task presentation and item p-values and Rir-scores by Roelofs et al. (2019)

Features	Mean P-value	Mean Rir-value
Linguistic text features		
Number of sentences	.20*	.11
Number of words	.25**	.21
Average word length	-.09	.08
Average sentence length	.03	.14
Number of different words	.18	.19*
Different lemmas	.16	.20*
Type token ratio 1= # of different words/number of words (tokens)	-.24**	-.12
Text Characteristics: Content area		
O1 (Municipal) laws and regulations	.06	.07
O2 Crime rate	.01	-.04
O3 Economic statistics	-.08	.17
O4 Health	-.09	-.16
O5 Lifestyle	.00	-.12
O6 Environment and sustainability	.01	.15
O7 Social norms and manners	.08	-.04
O8 Traffic and transport	.06	.28**
O9 Work	.05	.01
O10 Scientific debate and research	-.08	-.20*

This correlation is subject to the comment that this is only one test

Task characteristic: extent of information to be used	Mean P-value	Mean Rir-value
Local understanding	.07	-.01
Overall within 1 paragraph	.17	.15
Overall 2 paragraphs	.10	-.07
Overall the entire text	-.39**	-.09
Task characteristic: Information task to be performed		
Meta-task	.04	-.21*
Consequence task	-.18*	.21*
Label or name theme of a passage	.10	-.03
Select core sentences in sections of text	-.12	-.11
Selecting written all summary sentence	.10	.11
Look up cause in text	-.08	.14
Look up step in procedure or process	.05	.08
Look up tracing arguments (including disadvantages-benefits)	-.15	.06
Contrast arguments, views, outcomes	-.08	-.17
Look up conclusions in the text	.03	.12
Draw own conclusion through combination of informational elements	-.20*	-.01
Look up/retrieve applicable stated fact	-.04	.06
Convert textual info and numbers to graph	.02	.08
Assess statements or arguments following text	-.55**	.10
Assess follow-up actions and application to situations	-.04	.11
Task characteristic: underlying information literacy		
Recognize problematization relativize previous information	-.01	.05
Meta-reflection on rhetorical concepts	.11	-.12
Retrieve social communicative meaning	.08	-.20*
Recognizing the target audience of a text	.15	-.09
Recalling the meaning of an expression	-.06	.12

Retrieve the meaning of a cross-reference or contextual element	.10	.09
Be able to infer tone from language form or wording used	-.01	.05
Determine relationships between numbers	-.25**	.03
Task characteristic: target skills according to test matrix		
1. Can express the main idea of a text	.08	.00
2. Distinguishes between main and minor points	.08	-.16
3. Establishes relationships between sections of text	.02	-.22*
4. Organize information (elements)	-.35**	.10
5. Recognize imagery	.10	.03
6. Make relationships between textual information and general knowledge	.12	.24**
7. Can convey the intent of portions of text	-.01	.10
8. Can articulate the writer's intent	.06	-.13
9. Evaluate and assess relationships between and within texts	.08	.01
10. Can summarize text succinctly	-.09	-.09
Task characteristic: factors affecting cognitive load		
Finding literally stated information	.35**	.09
Needed information is a known fact	.12	.10
Number of inferences to be made	-.72**	-.04
Answering requires reversal of thinking	.01	.03
Access skills:		
Answering requires additional skill	-.18*	.07
Information needed outside the text	-.16	-.04
Characteristics of task presentation		
The key contains the best possible and complete answer to the question	.13	.37**
The task requires the elimination of response options	.10	-.23**
The assignment presentation is complete in itself	-.12	.08
The number of substantively plausible distractors	-.33**	-.07

Appendix 4: Results of correlational analyses between all information features and item parameter values (N = 128)

Correlations

		GemP	GemRIR
NalineaasNDZ_sum	Pearson Correlation	-,190*	-,014
	Sig. (2-tailed)	,032	,879
	N	128	128
TekstlengteNDZ_sum	Pearson Correlation	-,098	,053
	Sig. (2-tailed)	,273	,550
	N	128	128
Nelementen_sum	Pearson Correlation	-,183*	,036
	Sig. (2-tailed)	,038	,689
	N	128	128
Nrelaties_sum	Pearson Correlation	-,155	,033
	Sig. (2-tailed)	,080	,713
	N	128	128
Infotype1 Info-element: Personen	Pearson Correlation	-,112	,148
	Sig. (2-tailed)	,207	,095
	N	128	128
Infotype2 Info-element: Planten en dieren	Pearson Correlation	,085	,028
	Sig. (2-tailed)	,343	,756
	N	128	128
Infotype3 Info-element: Gebruiksvoorwerp	Pearson Correlation	-,112	,147
	Sig. (2-tailed)	,209	,098
	N	128	128
Infotype4 Info-element: Concrete substanties	Pearson Correlation	,049	-,048
	Sig. (2-tailed)	,580	,589
	N	128	128
Infotype5 Info-element: Voeding en verzorging	Pearson Correlation	-,093	-,187*
	Sig. (2-tailed)	,295	,034
	N	128	128
Infotype6 Info-element: Concreet overig	Pearson Correlation	-,180*	,025
	Sig. (2-tailed)	,042	,781
	N	128	128
Infotype7 Info-element: Concreet gebeuren	Pearson Correlation	-,021	,111
	Sig. (2-tailed)	,815	,211
	N	128	128
Infotype8 Info-element: Plaats	Pearson Correlation	-,008	,064
	Sig. (2-tailed)	,931	,473
	N	128	128
Infotype9 Info-element: Tijd	Pearson Correlation	,016	-,082
	Sig. (2-tailed)	,862	,355
	N	128	128
Infotype11 Info-element: Abstracte substanties	Pearson Correlation	-,075	-,027
	Sig. (2-tailed)	,401	,761
	N	128	128
Infotype12 Info-element: Abstract gebeuren	Pearson Correlation	-,199*	-,005
	Sig. (2-tailed)	,024	,952
	N	128	128
Infotype13 Info-element: Organisatie	Pearson Correlation	,053	,031
	Sig. (2-tailed)	,553	,727
	N	128	128

Infotype14 Info-element: Abstract overig	Pearson Correlation	-,163	,033
	Sig. (2-tailed)	,066	,707
	N	128	128
Infotype21 Info-element: Direct waarneembare kenmerken van personen doodsbleek, dwergachtig	Pearson Correlation	-,054	-,038
	Sig. (2-tailed)	,548	,669
	N	128	128
Infotype22 Info-element: Emotionele kenmerken en sociaal gedrag gegriefd, goedgelovig	Pearson Correlation	,117	-,061
	Sig. (2-tailed)	,187	,496
	N	128	128
Infotype23 Info-element: Direct waarneembare kenmerken van dingen flanellen, geel	Pearson Correlation	-,103	,039
	Sig. (2-tailed)	,247	,662
	N	128	128
Infotype24 Info-element: Niet-direct waarneembare kenmerken teerarm, kiemvrij	Pearson Correlation	-,166	-,074
	Sig. (2-tailed)	,061	,407
	N	128	128
Infotype25 Info-element: Tijd voorbijgaand, vrijdags	Pearson Correlation	-,132	-,067
	Sig. (2-tailed)	,137	,455
	N	128	128
Infotype26 Info-element: Plaats binnenlands, Gelders	Pearson Correlation	-,077	-,052
	Sig. (2-tailed)	,388	,556
	N	128	128
Infotype27 Info-element: Specifieke evaluatie (positief/negatief) onverslijtbaar; lawaaierig	Pearson Correlation	,093	,067
	Sig. (2-tailed)	,295	,455
	N	128	128
Infotype28 Info-element: Algemene evaluatie (positief/negatief/zonder richting) mooi; verwerpelijk; aanmerkelijk	Pearson Correlation	,093	-,209*
	Sig. (2-tailed)	,298	,018
	N	128	128
Infotype29 Info-element: Epistemische evaluatie (positief/negatief) steekhoudend; onzinnig	Pearson Correlation	-,210*	,035
	Sig. (2-tailed)	,017	,698
	N	128	128
Infotype30 Info-element: Overige (niet-evaluatieve) abstracte adjectieven aanverwant, aandachtig	Pearson Correlation	-,054	,076
	Sig. (2-tailed)	,547	,394
	N	128	128
Infotype31 Algemene evaluatie (zonder richting) mooi; verwerpelijk; aanmerkelijk	Pearson Correlation	-,071	,135
	Sig. (2-tailed)	,428	,128
	N	128	128
Infotype32 Epistemische evaluatie (positief/negatief) steekhoudend; onzinnig	Pearson Correlation	-,006	-,005
	Sig. (2-tailed)	,945	,959
	N	128	128
Infotype33 Epistemische evaluatie (negatief) steekhoudend; onzinnig	Pearson Correlation	-,122	-,116
	Sig. (2-tailed)	,169	,192
	N	128	128
Infotype34 Overige (niet-evaluatieve) abstracte adjectieven aanverwant, aandachtig	Pearson Correlation	-,084	-,065
	Sig. (2-tailed)	,347	,463
	N	128	128
Infotype35 Ongedefinieerd belastbaar, druk, smal	Pearson Correlation	-,064	-,172
	Sig. (2-tailed)	,473	,053
	N	128	128
Infotype1NDZ Info-element: Personen -NDZ	Pearson Correlation	-,310**	,145
	Sig. (2-tailed)	,000	,102
	N	128	128
Infotype2NDZ Info-element: Planten en dieren -NDZ	Pearson Correlation	,051	-,008
	Sig. (2-tailed)	,565	,925
	N	128	128

Infotype3NDZ Info-element: Gebruiksvoorwerp-NDZ	Pearson Correlation	-,161	,125
	Sig. (2-tailed)	,070	,160
	N	128	128
Infotype4NDZ Info-element: Concrete substanties-NDZ	Pearson Correlation	.[c]	.[c]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype5NDZ Info-element: Voeding en verzorging-NDZ	Pearson Correlation	-,086	-,093
	Sig. (2-tailed)	,332	,297
	N	128	128
Infotype6NDZ Info-element: Concreet overig-NDZ	Pearson Correlation	-,127	-,091
	Sig. (2-tailed)	,152	,307
	N	128	128
Infotype7NDZ Info-element: Concreet gebeuren-NDZ	Pearson Correlation	-,151	,005
	Sig. (2-tailed)	,089	,958
	N	128	128
Infotype8NDZ Info-element: Plaats-NDZ	Pearson Correlation	-,253**	,069
	Sig. (2-tailed)	,004	,439
	N	128	128
Infotype9NDZ Info-element: Tijd-NDZ	Pearson Correlation	,014	-,066
	Sig. (2-tailed)	,871	,461
	N	128	128
Infotype11NDZ Info-element: Abstracte substanties-NDZ	Pearson Correlation	-,085	,022
	Sig. (2-tailed)	,340	,809
	N	128	128
Infotype12NDZ Info-element: Abstract gebeuren-NDZ	Pearson Correlation	-,126	-,092
	Sig. (2-tailed)	,156	,304
	N	128	128
Infotype13NDZ Info-element: Organisatie-NDZ	Pearson Correlation	,022	,069
	Sig. (2-tailed)	,803	,439
	N	128	128
Infotype14NDZ Info-element: Abstract overig-NDZ	Pearson Correlation	-,120	-,153
	Sig. (2-tailed)	,178	,084
	N	128	128
Infotype21NDZ Info-element: Direct waarneembare kenmerken van personen doodsbleek, dwergachtig-NDZ	Pearson Correlation	.[c]	.[c]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype22NDZ Info-element: Emotionele kenmerken en sociaal gedrag gegriefd, goedgelovig-NDZ	Pearson Correlation	,061	-,151
	Sig. (2-tailed)	,497	,089
	N	128	128
Infotype23NDZ Info-element: Direct waarneembare kenmerken van dingen flanellen, geel-NDZ	Pearson Correlation	,046	,006
	Sig. (2-tailed)	,608	,942
	N	128	128
Infotype24NDZ Info-element: Niet-direct waarneembare kenmerken teerarm, kiemvrij-NDZ	Pearson Correlation	-,122	-,179*
	Sig. (2-tailed)	,171	,043
	N	128	128
Infotype25NDZ Info-element: Tijd voorbijgaand, vrijdags-NDZ	Pearson Correlation	-,140	,039
	Sig. (2-tailed)	,115	,661
	N	128	128
Infotype26NDZ Info-element: Plaats binnenlands, Gelders-NDZ	Pearson Correlation	-,214*	-,154
	Sig. (2-tailed)	,015	,082
	N	128	128
Infotype27NDZ Info-element: Specifieke evaluatie (positief/negatief) onverslijtbaar; lawaaierig-NDZ	Pearson Correlation	-,059	,018
	Sig. (2-tailed)	,505	,842
	N	128	128

Infotype28NDZ Info-element: Algemene evaluatie (positief/negatief/zonder richting) mooi; verwerpelijk; aanmerkelijk-NDZ	Pearson Correlation	,126	-,037
	Sig. (2-tailed)	,158	,676
	N	128	128
Infotype29NDZ Info-element: Epistemische evaluatie (positief/negatief) steekhoudend; onzinnig-NDZ	Pearson Correlation	-,213*	,030
	Sig. (2-tailed)	,016	,736
	N	128	128
Infotype30NDZ Info-element: Overige (niet-evaluatieve) abstracte adjectieven aanverwant, aandachtig-NDZ	Pearson Correlation	-,132	,100
	Sig. (2-tailed)	,138	,262
	N	128	128
Infotype31NDZ Algemene evaluatie (zonder richting) mooi; verwerpelijk; aanmerkelijk-NDZ	Pearson Correlation	,021	,082
	Sig. (2-tailed)	,817	,360
	N	128	128
Infotype32NDZ Epistemische evaluatie (positief/negatief) steekhoudend; onzinnig-NDZ	Pearson Correlation	-,032	,097
	Sig. (2-tailed)	,720	,277
	N	128	128
Infotype33NDZ Epistemische evaluatie (negatief) steekhoudend; onzinnig-NDZ	Pearson Correlation	-,033	,002
	Sig. (2-tailed)	,710	,979
	N	128	128
Infotype34NDZ Overige (niet-evaluatieve) abstracte adjectieven aanverwant, aandachtig-NDZ	Pearson Correlation	.c	.c
	Sig. (2-tailed)	.	.
	N	128	128
Infotype35NDZ Ongedefinieerd belastbaar, druk, smal-NDZ	Pearson Correlation	-,064	-,172
	Sig. (2-tailed)	,473	,053
	N	128	128
Infotype1AFL Info-element: Personen -AFL	Pearson Correlation	,164	,056
	Sig. (2-tailed)	,064	,529
	N	128	128
Infotype2AFL Info-element: Planten en dieren -AFL	Pearson Correlation	,135	-,027
	Sig. (2-tailed)	,128	,759
	N	128	128
Infotype3AFL Info-element: Gebruiksvoorwerp-AFL	Pearson Correlation	-,121	-,100
	Sig. (2-tailed)	,173	,259
	N	128	128
Infotype4AFL Info-element: Concrete substanties-AFL	Pearson Correlation	.c	.c
	Sig. (2-tailed)	.	.
	N	128	128
Infotype5AFL Info-element: Voeding en verzorging-AFL	Pearson Correlation	,003	-,068
	Sig. (2-tailed)	,972	,443
	N	128	128
Infotype6AFL Info-element: Concreet overig-AFL	Pearson Correlation	,022	,055
	Sig. (2-tailed)	,804	,534
	N	128	128
Infotype7AFL Info-element: Concreet gebeuren-AFL	Pearson Correlation	,081	,008
	Sig. (2-tailed)	,365	,929
	N	128	128
Infotype8AFL Info-element: Plaats-AFL	Pearson Correlation	-,119	-,023
	Sig. (2-tailed)	,182	,799
	N	128	128
Infotype9AFL Info-element: Tijd-AFL	Pearson Correlation	,011	-,073
	Sig. (2-tailed)	,899	,412
	N	128	128
Infotype11AFL Info-element: Abstracte substanties-AFL	Pearson Correlation	-,021	-,150
	Sig. (2-tailed)	,810	,091
	N	128	128

Infotype12AFL Info-element: Abstract gebeuren-AFL	Pearson Correlation	-,036	-,033
	Sig. (2-tailed)	,687	,714
	N	128	128
Infotype13AFL Info-element: Organisatie-AFL	Pearson Correlation	,079	-,081
	Sig. (2-tailed)	,373	,362
	N	128	128
Infotype14AFL Info-element: Abstract overig-AFL	Pearson Correlation	,077	,006
	Sig. (2-tailed)	,391	,948
	N	128	128
Infotype21AFL Info-element: Direct waarneembare kenmerken van personen doodsbleek, dwergachtig-AFL	Pearson Correlation	.[c]	.[c]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype22AFL Info-element: Emotionele kenmerken en sociaal gedrag gegriefd, goedgelovig-AFL	Pearson Correlation	,012	,049
	Sig. (2-tailed)	,894	,579
	N	128	128
Infotype23AFL Info-element: Direct waarneembare kenmerken van dingen flanellen, geel-AFL	Pearson Correlation	-,132	,061
	Sig. (2-tailed)	,139	,492
	N	128	128
Infotype24AFL Info-element: Niet-direct waarneembare kenmerken teerarm, kiemvrij-AFL	Pearson Correlation	-,095	,035
	Sig. (2-tailed)	,285	,695
	N	128	128
Infotype25AFL Info-element: Tijd voorbijgaand, vrijdags-AFL	Pearson Correlation	-,084	,029
	Sig. (2-tailed)	,348	,745
	N	128	128
Infotype26AFL Info-element: Plaats binnenlands, Gelders-AFL	Pearson Correlation	.[c]	.[c]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype27AFL Info-element: Specifieke evaluatie (positief/negatief) onverslijtbaar; lawaaierig-AFL	Pearson Correlation	-,025	,015
	Sig. (2-tailed)	,779	,869
	N	128	128
Infotype28AFL Info-element: Algemene evaluatie (positief/negatief/zonder richting) mooi; verwerpelijk; aanmerkelijk-AFL	Pearson Correlation	,114	-,205*
	Sig. (2-tailed)	,201	,020
	N	128	128
Infotype29AFL Info-element: Epistemische evaluatie (positief/negatief) steekhoudend; onzinnig-AFL	Pearson Correlation	,071	,027
	Sig. (2-tailed)	,429	,758
	N	128	128
Infotype30AFL Info-element: Overige (niet-evaluatieve) abstracte adjectieven aanverwant, aandachtig-AFL	Pearson Correlation	,084	-,156
	Sig. (2-tailed)	,347	,078
	N	128	128
Infotype31AFL Algemene evaluatie (zonder richting) mooi; verwerpelijk; aanmerkelijk-AFL	Pearson Correlation	,045	,106
	Sig. (2-tailed)	,611	,232
	N	128	128
Infotype32AFL Epistemische evaluatie (positief/negatief) steekhoudend; onzinnig-AFL	Pearson Correlation	.[c]	.[c]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype33AFL Epistemische evaluatie (negatief) steekhoudend; onzinnig-AFL	Pearson Correlation	.[c]	.[c]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype34AFL Overige (niet-evaluatieve) abstracte adjectieven aanverwant, aandachtig-AFL	Pearson Correlation	.[c]	.[c]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype35AFL Ongedefinieerd belastbaar, druk, smal-AFL	Pearson Correlation	.[c]	.[c]
	Sig. (2-tailed)	.	.
	N	128	128

TypeR01 Relatietype:Actor _ hele item	Pearson Correlation	-,021	-,094
	Sig. (2-tailed)	,814	,291
	N	128	128
TypeR02 Relatietype:Bron _ hele item	Pearson Correlation	,026	,112
	Sig. (2-tailed)	,772	,210
	N	128	128
TypeR03 Relatietype:Brononderbouwing_ hele item	Pearson Correlation	-,031	-,072
	Sig. (2-tailed)	,726	,422
	N	128	128
TypeR04 Relatietype:conditionele relatie_ hele item	Pearson Correlation	-,091	,127
	Sig. (2-tailed)	,305	,154
	N	128	128
TypeR05 Relatietype:Conclusie_ hele item	Pearson Correlation	-,049	-,024
	Sig. (2-tailed)	,582	,785
	N	128	128
TypeR06 Relatietype:Contrasterende relatie_ hele item	Pearson Correlation	-,073	,176*
	Sig. (2-tailed)	,414	,047
	N	128	128
TypeR07 Relatietype:Def_ hele item	Pearson Correlation	-,204*	-,010
	Sig. (2-tailed)	,021	,912
	N	128	128
TypeR08 Relatietype:Eff_ hele item	Pearson Correlation	-,098	,022
	Sig. (2-tailed)	,272	,803
	N	128	128
TypeR09 Relatietype:Evaluatief_ hele item	Pearson Correlation	-,077	-,040
	Sig. (2-tailed)	,386	,655
	N	128	128
TypeR10 Relatietype:kenmerk-relatie_ hele item	Pearson Correlation	-,129	,040
	Sig. (2-tailed)	,145	,653
	N	128	128
TypeR11 Relatietype:middel-doel_ hele item	Pearson Correlation	-,081	-,126
	Sig. (2-tailed)	,366	,156
	N	128	128
TypeR12 Relatietype:Sequentieel, willekeurige opsomming_ hele item	Pearson Correlation	.c	.c
	Sig. (2-tailed)	.	.
	N	128	128
TypeR13 Relatietype:Sequentieel, geordende lijst_ hele item	Pearson Correlation	-,069	,063
	Sig. (2-tailed)	,440	,480
	N	128	128
TypeR14 Relatietype:Soort_ hele item	Pearson Correlation	-,095	,041
	Sig. (2-tailed)	,285	,642
	N	128	128
TypeR15 Relatietype:Voorbeeld_ hele item	Pearson Correlation	-,160	-,171
	Sig. (2-tailed)	,071	,054
	N	128	128
TypeR16 Relatietype:Temporeel_ hele item	Pearson Correlation	-,122	-,118
	Sig. (2-tailed)	,169	,184
	N	128	128
TypeR17 Relatietype:Functionele relatie_ hele item	Pearson Correlation	-,037	-,166
	Sig. (2-tailed)	,678	,061
	N	128	128
TypeR18 Relatietype:onderbouwend argument_ hele item	Pearson Correlation	,028	,117
	Sig. (2-tailed)	,758	,189
	N	128	128

TypeR19 Relatietype:Contrasterend Argumentatie_ hele item	Pearson Correlation	,067	,070
	Sig. (2-tailed)	,453	,433
	N	128	128
TypeR20 Relatietype:Resultaat_ hele item	Pearson Correlation	,014	-,017
	Sig. (2-tailed)	,880	,851
	N	128	128
TypeR21 Relatietype:toe_ hele item	Pearson Correlation	,026	-,016
	Sig. (2-tailed)	,768	,862
	N	128	128
TypeR22 Relatietype:In toevoeging tot (additief)_ hele item	Pearson Correlation	-,019	,111
	Sig. (2-tailed)	,830	,211
	N	128	128
TypeR23 Relatietype:comparatief-vergelijkend_ hele item	Pearson Correlation	-,013	-,014
	Sig. (2-tailed)	,888	,872
	N	128	128
TypeR01N Relatietype:Actor noodz	Pearson Correlation	-,065	,038
	Sig. (2-tailed)	,466	,673
	N	128	128
TypeR02N Relatietype:Bron noodz	Pearson Correlation	-,020	,149
	Sig. (2-tailed)	,824	,092
	N	128	128
TypeR03N Relatietype:Brononderbouwing noodz	Pearson Correlation	,005	-,224*
	Sig. (2-tailed)	,958	,011
	N	128	128
TypeR04N Relatietype:conditionele relatie noodz	Pearson Correlation	-,110	,060
	Sig. (2-tailed)	,216	,504
	N	128	128
TypeR05N Relatietype:Conclusie noodz	Pearson Correlation	,061	-,074
	Sig. (2-tailed)	,497	,407
	N	128	128
TypeR06N Relatietype:Contrasterende relatie noodz	Pearson Correlation	-,175*	,121
	Sig. (2-tailed)	,048	,175
	N	128	128
TypeR07N Relatietype:Def noodz	Pearson Correlation	-,142	-,043
	Sig. (2-tailed)	,110	,627
	N	128	128
TypeR08N Relatietype:Eff noodz	Pearson Correlation	-,077	-,089
	Sig. (2-tailed)	,391	,319
	N	128	128
TypeR09N Relatietype:Evaluatief noodz	Pearson Correlation	-,244**	-,021
	Sig. (2-tailed)	,006	,818
	N	128	128
TypeR10N Relatietype:kenmerk-relatie noodz	Pearson Correlation	-,297**	,039
	Sig. (2-tailed)	,001	,665
	N	128	128
TypeR11N Relatietype:middel-doel noodz	Pearson Correlation	-,068	-,067
	Sig. (2-tailed)	,449	,455
	N	128	128
TypeR12N Relatietype:Sequentieel, willekeurige opsomming noodz	Pearson Correlation	.c	.c
	Sig. (2-tailed)	.	.
	N	128	128
TypeR13N Relatietype:Sequentieel, geordende lijst noodz	Pearson Correlation	,070	,035
	Sig. (2-tailed)	,434	,692
	N	128	128

TypeR14N Relatietype:Soort noodz	Pearson Correlation	-,117	-,075
	Sig. (2-tailed)	,189	,403
	N	128	128
TypeR15N Relatietype:Voorbeeld noodz	Pearson Correlation	,021	-,082
	Sig. (2-tailed)	,814	,358
	N	128	128
TypeR16N Relatietype:Temporeel noodz	Pearson Correlation	-,125	-,024
	Sig. (2-tailed)	,161	,784
	N	128	128
TypeR17N Relatietype:Functionele relatie noodz	Pearson Correlation	,015	-,073
	Sig. (2-tailed)	,866	,412
	N	128	128
TypeR18N Relatietype:onderbouwend argument noodz	Pearson Correlation	.[c]	.[c]
	Sig. (2-tailed)	.	.
	N	128	128
TypeR19N Relatietype:Contrasterend Argumentatie noodz	Pearson Correlation	,084	,027
	Sig. (2-tailed)	,347	,766
	N	128	128
TypeR20N Relatietype:Resultaat noodz	Pearson Correlation	,073	-,065
	Sig. (2-tailed)	,414	,469
	N	128	128
TypeR21N Relatietype:toe noodz	Pearson Correlation	,112	,031
	Sig. (2-tailed)	,209	,730
	N	128	128
TypeR22N Relatietype:In toevoeging tot (additief)noodz	Pearson Correlation	,028	-,002
	Sig. (2-tailed)	,755	,981
	N	128	128
TypeR23N Relatietype:comparatief-vergelijkend noodz	Pearson Correlation	-,248**	-,046
	Sig. (2-tailed)	,005	,608
	N	128	128
Ninfo aantal informatie-elementen bij de opgave	Pearson Correlation	-,102	,009
	Sig. (2-tailed)	,250	,918
	N	128	128
NinfoNDZ aantal informatie-elementen nnodzakelijk voor vinden van het goede antwoord	Pearson Correlation	-,297**	-,078
	Sig. (2-tailed)	,001	,381
	N	128	128
NDIFR aantal verschillende relaties tussen info in de opgave	Pearson Correlation	-,149	-,062
	Sig. (2-tailed)	,094	,485
	N	128	128
NDIFRN aantal verschillende relaties tussen de noodzakelijke info-elementen in de opgave	Pearson Correlation	-,360**	-,058
	Sig. (2-tailed)	,000	,513
	N	128	128
Infotype1EX Info-element: Personen -expliciet	Pearson Correlation	-,114	,134
	Sig. (2-tailed)	,198	,131
	N	128	128
Infotype2EX Info-element: Planten en dieren -expliciet	Pearson Correlation	,085	,028
	Sig. (2-tailed)	,343	,756
	N	128	128
Infotype3EX Info-element: Gebruiksvoorwerp-expliciet	Pearson Correlation	-,121	,136
	Sig. (2-tailed)	,175	,127
	N	128	128
Infotype4EX Info-element: Concrete substanties-expliciet	Pearson Correlation	,049	-,048
	Sig. (2-tailed)	,580	,589
	N	128	128

Infotype5EX Info-element: Voeding en verzorging-expliciet	Pearson Correlation	-,093	-,186*
	Sig. (2-tailed)	,295	,035
	N	128	128
Infotype6EX Info-element: Concreet overig-expliciet	Pearson Correlation	-,176*	,023
	Sig. (2-tailed)	,046	,800
	N	128	128
Infotype7EX Info-element: Concreet gebeuren-expliciet	Pearson Correlation	-,007	,105
	Sig. (2-tailed)	,937	,239
	N	128	128
Infotype8EX Info-element: Plaats-expliciet	Pearson Correlation	-,009	,064
	Sig. (2-tailed)	,923	,475
	N	128	128
Infotype9EX Info-element: Tijd-expliciet	Pearson Correlation	,043	-,032
	Sig. (2-tailed)	,632	,721
	N	128	128
Infotype11EX Info-element: Abstracte substanties-expliciet	Pearson Correlation	-,075	-,027
	Sig. (2-tailed)	,401	,761
	N	128	128
Infotype12EX Info-element: Abstract gebeuren-expliciet	Pearson Correlation	-,156	-,010
	Sig. (2-tailed)	,079	,908
	N	128	128
Infotype13EX Info-element: Organisatie-expliciet	Pearson Correlation	,053	,031
	Sig. (2-tailed)	,553	,727
	N	128	128
Infotype14EX Info-element: Abstract overig-expliciet	Pearson Correlation	-,162	-,012
	Sig. (2-tailed)	,067	,894
	N	128	128
Infotype21EX Info-element: Direct waarneembare kenmerken van personen doodsbleek, dwergachtig-expliciet	Pearson Correlation	-,054	-,038
	Sig. (2-tailed)	,548	,669
	N	128	128
Infotype22EX Info-element: Emotionele kenmerken en sociaal gedrag gegriefd, goedgelovig-expliciet	Pearson Correlation	,122	-,058
	Sig. (2-tailed)	,169	,513
	N	128	128
Infotype23EX Info-element: Direct waarneembare kenmerken van dingen flanellen, geel-expliciet	Pearson Correlation	-,068	,025
	Sig. (2-tailed)	,444	,779
	N	128	128
Infotype24EX Info-element: Niet-direct waarneembare kenmerken teerarm, kiemvrij-expliciet	Pearson Correlation	-,140	-,084
	Sig. (2-tailed)	,115	,345
	N	128	128
Infotype25EX Info-element: Tijd voorbijgaand, vrijdags-expliciet	Pearson Correlation	-,113	-,075
	Sig. (2-tailed)	,203	,398
	N	128	128
Infotype26EX Info-element: Plaats binnenlands, Gelders-expliciet	Pearson Correlation	-,077	-,052
	Sig. (2-tailed)	,388	,556
	N	128	128
Infotype27EX Info-element: Specifieke evaluatie (positief/negatief) onverslijtbaar; lawaaierig-expliciet	Pearson Correlation	,096	,064
	Sig. (2-tailed)	,283	,475
	N	128	128
Infotype28EX Info-element: Algemene evaluatie (positief/negatief/zonder richting) mooi; verwerpelijk; aanmerkelijk-expliciet	Pearson Correlation	,084	-,286**
	Sig. (2-tailed)	,346	,001
	N	128	128
Infotype29EX Info-element: Epistemische evaluatie (positief/negatief) steekhoudend; onzinnig-expliciet	Pearson Correlation	-,191*	,070
	Sig. (2-tailed)	,031	,432
	N	128	128

Infotype30EX Info-element: Overige (niet-evaluatieve) abstracte adjectieven aanverwant, aandachtig-expliciet	Pearson Correlation	-,035	,076
	Sig. (2-tailed)	,692	,394
	N	128	128
Infotype31EX Algemene evaluatie (zonder richting) mooi; verwerpelijk; aanmerkelijk-expliciet	Pearson Correlation	-,057	,151
	Sig. (2-tailed)	,520	,088
	N	128	128
Infotype32EX Epistemische evaluatie (positief/negatief) steekhoudend; onzinnig-expliciet	Pearson Correlation	-,006	-,005
	Sig. (2-tailed)	,945	,959
	N	128	128
Infotype33EX Epistemische evaluatie (negatief) steekhoudend; onzinnig-expliciet	Pearson Correlation	-,128	-,116
	Sig. (2-tailed)	,149	,194
	N	128	128
Infotype34EX Overige (niet-evaluatieve) abstracte adjectieven aanverwant, aandachtig-expliciet	Pearson Correlation	-,084	-,065
	Sig. (2-tailed)	,347	,463
	N	128	128
Infotype35EX Ongedefinieerd belastbaar, druk, smal-expliciet	Pearson Correlation	-,064	-,172
	Sig. (2-tailed)	,473	,053
	N	128	128
Infotype1NDZEX Info-element: Personen -NDZEX	Pearson Correlation	-,301**	,112
	Sig. (2-tailed)	,001	,208
	N	128	128
Infotype2NDZEX Info-element: Planten en dieren -NDZEX	Pearson Correlation	,051	-,008
	Sig. (2-tailed)	,565	,925
	N	128	128
Infotype3NDZEX Info-element: Gebruiksvoorwerp-NDZEX	Pearson Correlation	-,160	,111
	Sig. (2-tailed)	,072	,214
	N	128	128
Infotype4NDZEX Info-element: Concrete substanties-NDZEX	Pearson Correlation	.c	.c
	Sig. (2-tailed)	.	.
	N	128	128
Infotype5NDZEX Info-element: Voeding en verzorging-NDZEX	Pearson Correlation	-,086	-,093
	Sig. (2-tailed)	,332	,297
	N	128	128
Infotype6NDZEX Info-element: Concreet overig-NDZEX	Pearson Correlation	-,127	-,091
	Sig. (2-tailed)	,152	,307
	N	128	128
Infotype7NDZEX Info-element: Concreet gebeuren-NDZEX	Pearson Correlation	-,095	-,032
	Sig. (2-tailed)	,289	,716
	N	128	128
Infotype8NDZEX Info-element: Plaats-NDZEX	Pearson Correlation	-,253**	,069
	Sig. (2-tailed)	,004	,439
	N	128	128
Infotype9NDZEX Info-element: Tijd-NDZEX	Pearson Correlation	,022	-,016
	Sig. (2-tailed)	,806	,861
	N	128	128
Infotype11NDZEX Info-element: Abstracte substanties-NDZEX	Pearson Correlation	-,085	,022
	Sig. (2-tailed)	,340	,809
	N	128	128
Infotype12NDZEX Info-element: Abstract gebeuren-NDZEX	Pearson Correlation	-,097	-,099
	Sig. (2-tailed)	,274	,267
	N	128	128
Infotype13NDZEX Info-element: Organisatie-NDZEX	Pearson Correlation	,022	,069
	Sig. (2-tailed)	,803	,439
	N	128	128

Infotype14NDZEX Info-element: Abstract overig-NDZEX	Pearson Correlation	-,155	-,149
	Sig. (2-tailed)	,080	,093
	N	128	128
Infotype21NDZEX Info-element: Direct waarneembare kenmerken van personen doodsbleek, dwergachtig-NDZEX	Pearson Correlation	.[c]	.[c]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype22NDZEX Info-element: Emotionele kenmerken en sociaal gedrag gegriefd, goedgelovig-NDZEX	Pearson Correlation	,061	-,151
	Sig. (2-tailed)	,497	,089
	N	128	128
Infotype23NDZEX Info-element: Direct waarneembare kenmerken van dingen flanellen, geel-NDZEX	Pearson Correlation	,046	,006
	Sig. (2-tailed)	,608	,942
	N	128	128
Infotype24NDZEX Info-element: Niet-direct waarneembare kenmerken teerarm, kiemvrij-NDZEX	Pearson Correlation	-,100	-,175*
	Sig. (2-tailed)	,260	,048
	N	128	128
Infotype25NDZEX Info-element: Tijd voorbijgaand, vrijdags-NDZEX	Pearson Correlation	-,140	,039
	Sig. (2-tailed)	,115	,661
	N	128	128
Infotype26NDZEX Info-element: Plaats binnenlands, Gelders-NDZEX	Pearson Correlation	-,214*	-,154
	Sig. (2-tailed)	,015	,082
	N	128	128
Infotype27NDZEX Info-element: Specifieke evaluatie (positief/negatief) onverslijtbaar; lawaaierig-NDZEX	Pearson Correlation	-,034	,008
	Sig. (2-tailed)	,703	,932
	N	128	128
Infotype28NDZEX Info-element: Algemene evaluatie (positief/negatief/zonder richting) mooi; verwerpelijk; aanmerkelijk-NDZEX	Pearson Correlation	,020	-,232**
	Sig. (2-tailed)	,826	,008
	N	128	128
Infotype29NDZEX Info-element: Epistemische evaluatie (positief/negatief) steekhoudend; onzinnig-NDZEX	Pearson Correlation	,084	,083
	Sig. (2-tailed)	,344	,353
	N	128	128
Infotype30NDZEX Info-element: Overige (niet-evaluatieve) abstracte adjectieven aanverwant, aandachtig-NDZEX	Pearson Correlation	-,161	,089
	Sig. (2-tailed)	,070	,317
	N	128	128
Infotype31NDZEX Algemene evaluatie (zonder richting) mooi; verwerpelijk; aanmerkelijk-NDZEX	Pearson Correlation	,021	,082
	Sig. (2-tailed)	,817	,360
	N	128	128
Infotype32NDZEX Epistemische evaluatie (positief/negatief) steekhoudend; onzinnig-NDZEX	Pearson Correlation	-,032	,097
	Sig. (2-tailed)	,720	,277
	N	128	128
Infotype33NDZEX Epistemische evaluatie (negatief) steekhoudend; onzinnig-NDZEX	Pearson Correlation	-,033	,002
	Sig. (2-tailed)	,710	,979
	N	128	128
Infotype34NDZEX Overige (niet-evaluatieve) abstracte adjectieven aanverwant, aandachtig-NDZEX	Pearson Correlation	.[c]	.[c]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype35NDZEX Ongedefinieerd belastbaar, druk, smal-NDZEX	Pearson Correlation	-,064	-,172
	Sig. (2-tailed)	,473	,053
	N	128	128
Infotype1AFLEX Info-element: Personen -AFLEX	Pearson Correlation	,164	,056
	Sig. (2-tailed)	,064	,529
	N	128	128
Infotype2AFLEX Info-element: Planten en dieren -AFLEX	Pearson Correlation	,135	-,027
	Sig. (2-tailed)	,128	,759
	N	128	128

Infotype3AFLEX Info-element: Gebruiksvoorwerp-AFLEX	Pearson Correlation	-,121	-,100
	Sig. (2-tailed)	,173	,259
	N	128	128
Infotype4AFLEX Info-element: Concrete substanties-AFLEX	Pearson Correlation	.[c]	.[c]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype5AFLEX Info-element: Voeding en verzorging-AFLEX	Pearson Correlation	,003	-,068
	Sig. (2-tailed)	,972	,443
	N	128	128
Infotype6AFLEX Info-element: Concreet overig-AFLEX	Pearson Correlation	,022	,055
	Sig. (2-tailed)	,804	,534
	N	128	128
Infotype7AFLEX Info-element: Concreet gebeuren-AFLEX	Pearson Correlation	,081	,008
	Sig. (2-tailed)	,365	,929
	N	128	128
Infotype8AFLEX Info-element: Plaats-AFLEX	Pearson Correlation	-,119	-,023
	Sig. (2-tailed)	,182	,799
	N	128	128
Infotype9AFLEX Info-element: Tijd-AFLEX	Pearson Correlation	,011	-,073
	Sig. (2-tailed)	,899	,412
	N	128	128
Infotype11AFLEX Info-element: Abstracte substanties-AFLEX	Pearson Correlation	-,021	-,150
	Sig. (2-tailed)	,810	,091
	N	128	128
Infotype12AFLEX Info-element: Abstract gebeuren-AFLEX	Pearson Correlation	-,040	-,027
	Sig. (2-tailed)	,650	,758
	N	128	128
Infotype13AFLEX Info-element: Organisatie-AFLEX	Pearson Correlation	,079	-,081
	Sig. (2-tailed)	,373	,362
	N	128	128
Infotype14AFLEX Info-element: Abstract overig-AFLEX	Pearson Correlation	,061	-,016
	Sig. (2-tailed)	,493	,860
	N	128	128
Infotype21AFLEX Info-element: Direct waarneembare kenmerken van personen doodsbleek, dwergachtig-AFLEX	Pearson Correlation	.[c]	.[c]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype22AFLEX Info-element: Emotionele kenmerken en sociaal gedrag gegriefd, goedgelovig-AFLEX	Pearson Correlation	,012	,049
	Sig. (2-tailed)	,894	,579
	N	128	128
Infotype23AFLEX Info-element: Direct waarneembare kenmerken van dingen flanellen, geel-AFLEX	Pearson Correlation	-,132	,061
	Sig. (2-tailed)	,139	,492
	N	128	128
Infotype24AFLEX Info-element: Niet-direct waarneembare kenmerken teerarm, kiemvrij-AFLEX	Pearson Correlation	-,081	,031
	Sig. (2-tailed)	,366	,727
	N	128	128
Infotype25AFLEX Info-element: Tijd voorbijgaand, vrijdags-AFLEX	Pearson Correlation	-,084	,029
	Sig. (2-tailed)	,348	,745
	N	128	128
Infotype26AFLEX Info-element: Plaats binnenlands, Gelders-AFLEX	Pearson Correlation	.[c]	.[c]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype27AFLEX Info-element: Specifieke evaluatie (positief/negatief) onverslijtbaar; lawaaierig-AFLEX	Pearson Correlation	-,042	-,008
	Sig. (2-tailed)	,635	,929
	N	128	128

Infotype28AFLEX Info-element: Algemene evaluatie (positief/negatief/zonder richting) mooi; verwerpelijk; aanmerkelijk-AFLEX	Pearson Correlation	,114	-,205*
	Sig. (2-tailed)	,201	,020
	N	128	128
Infotype29AFLEX Info-element: Epistemische evaluatie (positief/negatief) steekhoudend; onzinnig-AFLEX	Pearson Correlation	,054	,076
	Sig. (2-tailed)	,547	,391
	N	128	128
Infotype30AFLEX Info-element: Overige (niet-evaluatieve) abstracte adjectieven aanverwant, aandachtig-AFLEX	Pearson Correlation	,084	-,156
	Sig. (2-tailed)	,347	,078
	N	128	128
Infotype31AFLEX Algemene evaluatie (zonder richting) mooi; verwerpelijk; aanmerkelijk-AFLEX	Pearson Correlation	,031	,112
	Sig. (2-tailed)	,727	,209
	N	128	128
Infotype32AFLEX Epistemische evaluatie (positief/negatief) steekhoudend; onzinnig-AFLEX	Pearson Correlation	.c	.c
	Sig. (2-tailed)	.	.
	N	128	128
Infotype33AFLEX Epistemische evaluatie (negatief) steekhoudend; onzinnig-AFLEX	Pearson Correlation	.c	.c
	Sig. (2-tailed)	.	.
	N	128	128
Infotype34AFLEX Overige (niet-evaluatieve) abstracte adjectieven aanverwant, aandachtig-AFLEX	Pearson Correlation	.c	.c
	Sig. (2-tailed)	.	.
	N	128	128
Infotype35AFLEX Ongedefinieerd belastbaar, druk, smal-AFLEX	Pearson Correlation	.c	.c
	Sig. (2-tailed)	.	.
	N	128	128
TypeR01NEX Relatietype:Actor noodz-EX	Pearson Correlation	-,065	,038
	Sig. (2-tailed)	,466	,673
	N	128	128
TypeR02NEX Relatietype:Bron noodz-EX	Pearson Correlation	,003	,126
	Sig. (2-tailed)	,975	,156
	N	128	128
TypeR03NEX Relatietype:Brononderbouwing noodz-EX	Pearson Correlation	,005	-,224*
	Sig. (2-tailed)	,958	,011
	N	128	128
TypeR04NEX Relatietype:conditionele relatie noodz-EX	Pearson Correlation	-,107	,062
	Sig. (2-tailed)	,230	,490
	N	128	128
TypeR05NEX Relatietype:Conclusie noodz-EX	Pearson Correlation	,101	-,054
	Sig. (2-tailed)	,258	,544
	N	128	128
TypeR06NEX Relatietype:Contrasterende relatie noodz-EX	Pearson Correlation	-,102	,179*
	Sig. (2-tailed)	,250	,044
	N	128	128
TypeR07NEX Relatietype:Def noodz-EX	Pearson Correlation	-,075	-,127
	Sig. (2-tailed)	,397	,152
	N	128	128
TypeR08NEX Relatietype:Eff noodz-EX	Pearson Correlation	-,065	-,085
	Sig. (2-tailed)	,466	,342
	N	128	128
TypeR09NEX Relatietype:Evaluatief noodz-EX	Pearson Correlation	-,213*	-,014
	Sig. (2-tailed)	,016	,877
	N	128	128
TypeR10NEX Relatietype:kenmerk-relatie noodz-EX	Pearson Correlation	-,297**	,034
	Sig. (2-tailed)	,001	,706
	N	128	128

TypeR11NEX Relatietype:middel-doel noodz-EX	Pearson Correlation	-,046	-,014
	Sig. (2-tailed)	,607	,875
	N	128	128
TypeR12NEX Relatietype:Sequentieel, willekeurige opsomming noodz-EX	Pearson Correlation	.[c]	.[c]
	Sig. (2-tailed)	.	.
	N	128	128
TypeR13NEX Relatietype:Sequentieel, geordende lijst noodz-EX	Pearson Correlation	,064	,036
	Sig. (2-tailed)	,471	,683
	N	128	128
TypeR14NEX Relatietype:Soort noodz-EX	Pearson Correlation	-,121	-,048
	Sig. (2-tailed)	,174	,591
	N	128	128
TypeR15NEX Relatietype:Voorbeeld noodz-EX	Pearson Correlation	,085	-,081
	Sig. (2-tailed)	,343	,363
	N	128	128
TypeR16NEX Relatietype:Temporeel noodz-EX	Pearson Correlation	-,159	-,030
	Sig. (2-tailed)	,072	,740
	N	128	128
TypeR17NEX Relatietype:Functionele relatie noodz-EX	Pearson Correlation	,015	-,073
	Sig. (2-tailed)	,866	,412
	N	128	128
TypeR18NEX Relatietype:onderbouwend argument noodz-EX	Pearson Correlation	.[c]	.[c]
	Sig. (2-tailed)	.	.
	N	128	128
TypeR19NEX Relatietype:Contrasterend Argumentatie noodz-EX	Pearson Correlation	,084	,027
	Sig. (2-tailed)	,347	,766
	N	128	128
TypeR20NEX Relatietype:Resultaat noodz-EX	Pearson Correlation	,073	-,065
	Sig. (2-tailed)	,414	,469
	N	128	128
TypeR21NEX Relatietype:toe noodz-EX	Pearson Correlation	,093	,075
	Sig. (2-tailed)	,296	,403
	N	128	128
TypeR22NEX Relatietype:In toevoeging tot (additief)noodz-EX	Pearson Correlation	,023	,132
	Sig. (2-tailed)	,797	,138
	N	128	128
TypeR23NEX Relatietype:comparatief-vergelijkend noodz-EX	Pearson Correlation	-,220*	,045
	Sig. (2-tailed)	,013	,613
	N	128	128
NinfoNDZEX aantal expliciete informatie-elementen noodzakelijk voor vinden van het goede antwoord	Pearson Correlation	-,271**	-,139
	Sig. (2-tailed)	,002	,118
	N	128	128
NinfoEX aantal expliciete informatie-elementen bij de opgave	Pearson Correlation	-,106	,000
	Sig. (2-tailed)	,234	,999
	N	128	128
NinfoAFLEX aantal expliciete informatie-elementen die toeleiden tot de afleiders	Pearson Correlation	-,019	-,104
	Sig. (2-tailed)	,834	,244
	N	128	128
NEXDIFRNEX aantal verschillende expliciete relaties tussen noodzakelijke info-elementen in de opgave	Pearson Correlation	-,304**	-,063
	Sig. (2-tailed)	,000	,479
Type01PRO N relaties - item Info-element: Personen -	Pearson Correlation	-,108	,084
	Sig. (2-tailed)	,227	,347
	N	128	128
Type02PRO N relaties - item Info-element: Planten en dieren	Pearson Correlation	,056	,030

	Sig. (2-tailed)	,533	,735
	N	128	128
Type03PRO N relaties - item Info-element: Gebruiksvoorwerp	Pearson Correlation	-,125	,202*
	Sig. (2-tailed)	,160	,022
	N	128	128
Type04PRO N relaties - item Info-element: Concrete substanties	Pearson Correlation	,049	-,048
	Sig. (2-tailed)	,580	,589
	N	128	128
Type05PRO N relaties - item Info-element: Voeding en verzorging	Pearson Correlation	-,097	-,146
	Sig. (2-tailed)	,278	,100
	N	128	128
Type06PRO N relaties - item Info-element: Concreet overig	Pearson Correlation	-,171	,053
	Sig. (2-tailed)	,054	,556
	N	128	128
Type07PRO N relaties - item Info-element: Concreet gebeuren	Pearson Correlation	-,020	,083
	Sig. (2-tailed)	,823	,351
	N	128	128
Type08PRO N relaties - item Info-element: Plaats	Pearson Correlation	,015	,019
	Sig. (2-tailed)	,863	,828
	N	128	128
Type09PRO N relaties - item Info-element: Tijd	Pearson Correlation	,002	-,133
	Sig. (2-tailed)	,981	,134
	N	128	128
Type11PRO N relaties - item Info-element: Abstracte substanties	Pearson Correlation	-,115	,035
	Sig. (2-tailed)	,198	,695
	N	128	128
Type12PRO N relaties - item Info-element: Abstract gebeuren	Pearson Correlation	-,122	-,037
	Sig. (2-tailed)	,171	,681
	N	128	128
Type13PRO N relaties - item Info-element: Organisatie	Pearson Correlation	,059	,052
	Sig. (2-tailed)	,510	,559
	N	128	128
Type14PRO N relaties - item Info-element: Abstract overig	Pearson Correlation	-,165	-,003
	Sig. (2-tailed)	,063	,975
	N	128	128
Type21PRO N relaties - item Info-element: Direct waarneembare kenmerken van personen doodsbleek, dwergachtig	Pearson Correlation	-,068	-,101
	Sig. (2-tailed)	,447	,259
	N	128	128
Type22PRO N relaties - item Info-element: Emotionele kenmerken en sociaal gedrag gegriefd, goedgelovig	Pearson Correlation	,061	-,061
	Sig. (2-tailed)	,497	,493
	N	128	128
Type23PRO N relaties - item Info-element: Direct waarneembare kenmerken van dingen flanellen, geel	Pearson Correlation	-,008	,011
	Sig. (2-tailed)	,931	,904
	N	128	128
Type24PRO N relaties - item Info-element: Niet-direct waarneembare kenmerken teerarm, kiemvrij	Pearson Correlation	-,095	,052
	Sig. (2-tailed)	,289	,558
	N	128	128
Type25PRO N relaties - item Info-element: Tijd voorbijgaand, vrijdags	Pearson Correlation	-,103	,041
	Sig. (2-tailed)	,248	,642
	N	128	128
Type26PRO N relaties - item Info-element: Plaats binnenlands, Gelders	Pearson Correlation	-,117	-,105
	Sig. (2-tailed)	,190	,237
	N	128	128
Type27PRO N relaties - item Info-element: Specifieke evaluatie	Pearson Correlation	,043	,012

(positief/negatief) onverslijtbaar; lawaaierig	Sig. (2-tailed)	,632	,897
	N	128	128
Type28PRO N relaties - item Info-element: Algemene evaluatie (positief/negatief/zonder richting) mooi; verwerpelijk; aanmerkelijk	Pearson Correlation	,107	-,155
	Sig. (2-tailed)	,227	,081
	N	128	128
Type29PRO N relaties - item Info-element: Epistemische evaluatie (positief/negatief) steekhoudend; onzinnig	Pearson Correlation	-,042	,007
	Sig. (2-tailed)	,634	,936
	N	128	128
Type30PRO N relaties - item Info-element: Overige (niet-evaluatieve) abstracte adjectieven aanverwant, aandachtig	Pearson Correlation	,003	,089
	Sig. (2-tailed)	,976	,318
	N	128	128
Type31PRO N relaties - item Info-element: Algemene evaluatie (zonder richting) mooi; verwerpelijk; aanmerkelijk	Pearson Correlation	-,095	,157
	Sig. (2-tailed)	,285	,076
	N	128	128
Type32PRO N relaties - item Info-element: Epistemische evaluatie (positief/negatief) steekhoudend; onzinnig	Pearson Correlation	,007	-,006
	Sig. (2-tailed)	,933	,945
	N	128	128
Type33PRO N relaties - item Info-element: Epistemische evaluatie (negatief) steekhoudend; onzinnig	Pearson Correlation	-,120	-,037
	Sig. (2-tailed)	,178	,682
	N	128	128
Type34PRO N relaties - item Info-element: Overige (niet-evaluatieve) abstracte adjectieven aanverwant, aandachtig	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Type35PRO N relaties - item Info-element: Ongedefinieerd belastbaar, druk, smal	Pearson Correlation	-,064	-,172
	Sig. (2-tailed)	,473	,053
	N	128	128
Type01PRSL N relaties - sleutel Info-element: Personen -	Pearson Correlation	-,301**	,088
	Sig. (2-tailed)	,001	,323
	N	128	128
Type02PRSL N relaties - sleutel Info-element: Planten en dieren	Pearson Correlation	,093	-,018
	Sig. (2-tailed)	,296	,844
	N	128	128
Type03PRSL N relaties - sleutel Info-element: Gebruiksvoorwerp	Pearson Correlation	-,173	,118
	Sig. (2-tailed)	,051	,185
	N	128	128
Type04PRSL N relaties - sleutel Info-element: Concrete substanties	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Type05PRSL N relaties - sleutel Info-element: Voeding en verzorging	Pearson Correlation	-,164	-,048
	Sig. (2-tailed)	,064	,587
	N	128	128
Type06PRSL N relaties - sleutel Info-element: Concreet overig	Pearson Correlation	-,104	-,053
	Sig. (2-tailed)	,244	,549
	N	128	128
Type07PRSL N relaties - sleutel Info-element: Concreet gebeuren	Pearson Correlation	-,118	-,012
	Sig. (2-tailed)	,183	,891
	N	128	128
Type08PRSL N relaties - sleutel Info-element: Plaats	Pearson Correlation	-,217*	-,059
	Sig. (2-tailed)	,014	,507
	N	128	128
Type09PRSL N relaties - sleutel Info-element: Tijd	Pearson Correlation	,019	-,056
	Sig. (2-tailed)	,830	,527
	N	128	128
Type11PRSL N relaties - sleutel Info-element: Abstracte	Pearson Correlation	-,181*	,039

substanties	Sig. (2-tailed)	,040	,661
	N	128	128
Type12PRSL N relaties - sleutel Info-element: Abstract gebeuren	Pearson Correlation	-,085	-,056
	Sig. (2-tailed)	,340	,530
	N	128	128
Type13PRSL N relaties - sleutel Info-element: Organisatie	Pearson Correlation	,033	,079
	Sig. (2-tailed)	,712	,378
	N	128	128
Type14PRSL N relaties - sleutel Info-element: Abstract overig	Pearson Correlation	-,122	-,088
	Sig. (2-tailed)	,170	,322
	N	128	128
Type21PRSL N relaties - sleutel Info-element: Direct waarneembare kenmerken van personen doodsbleek, dwergachtig	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Type22PRSL N relaties - sleutel Info-element: Emotionele kenmerken en sociaal gedrag gegriefd, goedgelovig	Pearson Correlation	,073	,000
	Sig. (2-tailed)	,413	,996
	N	128	128
Type23PRSL N relaties - sleutel Info-element: Direct waarneembare kenmerken van dingen flanellen, geel	Pearson Correlation	,046	,006
	Sig. (2-tailed)	,608	,942
	N	128	128
Type24PRSL N relaties - sleutel Info-element: Niet-direct waarneembare kenmerken teerarm, kiemvrij	Pearson Correlation	-,055	-,128
	Sig. (2-tailed)	,540	,150
	N	128	128
Type25PRSL N relaties - sleutel Info-element: Tijd voorbijgaand, vrijdags	Pearson Correlation	,028	,054
	Sig. (2-tailed)	,754	,542
	N	128	128
Type26PRSL N relaties - sleutel Info-element: Plaats binnenlands, Gelders	Pearson Correlation	-,279**	-,108
	Sig. (2-tailed)	,001	,226
	N	128	128
Type27PRSL N relaties - sleutel Info-element: Specifieke evaluatie (positief/negatief) onverslijtbaar; lawaaierig	Pearson Correlation	-,033	-,132
	Sig. (2-tailed)	,714	,139
	N	128	128
Type28PRSL N relaties - sleutel Info-element: Algemene evaluatie (positief/negatief/zonder richting) mooi; verwerpelijk; aanmerkelijk	Pearson Correlation	,026	-,122
	Sig. (2-tailed)	,768	,170
	N	128	128
Type29PRSL N relaties - sleutel Info-element: Epistemische evaluatie (positief/negatief) steekhoudend; onzinnig	Pearson Correlation	-,221*	,053
	Sig. (2-tailed)	,012	,549
	N	128	128
Type30PRSL N relaties - sleutel Info-element: Overige (niet-evaluatieve) abstracte adjectieven aanverwant, aandachtig	Pearson Correlation	-,072	,121
	Sig. (2-tailed)	,418	,173
	N	128	128
Type31PRSL N relaties - sleutel Info-element: Algemene evaluatie (zonder richting) mooi; verwerpelijk; aanmerkelijk	Pearson Correlation	-,144	,118
	Sig. (2-tailed)	,105	,185
	N	128	128
Type32PRSL N relaties - sleutel Info-element: Epistemische evaluatie (positief/negatief) steekhoudend; onzinnig	Pearson Correlation	-,032	,097
	Sig. (2-tailed)	,720	,277
	N	128	128
Type33PRSL N relaties - sleutel Info-element: Epistemische evaluatie (negatief) steekhoudend; onzinnig	Pearson Correlation	,016	,133
	Sig. (2-tailed)	,861	,135
	N	128	128
Type34PRSL N relaties - sleutel Info-element: Overige (niet-evaluatieve) abstracte adjectieven aanverwant, aandachtig	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Type35PRSL N relaties - sleutel Info-element: Ongedefinieerd	Pearson Correlation	-,064	-,172

belastbaar, druk, smal	Sig. (2-tailed)	,473	,053
	N	128	128
NinfoPRSL aantal centraal staande informatie-elementen noodzakelijk voor de sleutel (minstens 1x per type)	Pearson Correlation	-,277**	-,102
	Sig. (2-tailed)	,002	,251
	N	128	128
NinfoPRO aantal centraal staande informatie-elementen bij de opgave (minstens 1x per type)	Pearson Correlation	-,097	,028
	Sig. (2-tailed)	,277	,753
	N	128	128
NinfoPRSL_4 aantal sterk centraal staande informatie-elementen noodzakelijk voor de sleutel (minstens 4 x per type)	Pearson Correlation	-,230**	-,014
	Sig. (2-tailed)	,009	,875
	N	128	128
NinfoPRO_4 aantal sterk centraal staande informatie-elementen bij de opgave (minstens 4 x per type)	Pearson Correlation	-,239**	-,015
	Sig. (2-tailed)	,007	,869
TypeR01IMP Relatietype:Actor _ hele item	Pearson Correlation	-,064	-,172
	Sig. (2-tailed)	,473	,053
	N	128	128
TypeR02IMP Relatietype:Bron _ hele item	Pearson Correlation	,039	,182*
	Sig. (2-tailed)	,659	,040
	N	128	128
TypeR03IMP Relatietype:Brononderbouwing_ hele item	Pearson Correlation	-,122	-,027
	Sig. (2-tailed)	,169	,759
	N	128	128
TypeR04IMP Relatietype:conditionele relatie_ hele item	Pearson Correlation	,022	,111
	Sig. (2-tailed)	,803	,214
	N	128	128
TypeR05IMP Relatietype:Conclusie_ hele item	Pearson Correlation	-,213*	-,029
	Sig. (2-tailed)	,016	,748
	N	128	128
TypeR06IMP Relatietype:Contrasterende relatie_ hele item	Pearson Correlation	,033	,162
	Sig. (2-tailed)	,714	,067
	N	128	128
TypeR07IMP Relatietype:Def_ hele item	Pearson Correlation	-,180*	,029
	Sig. (2-tailed)	,042	,741
	N	128	128
TypeR08IMP Relatietype:Eff_ hele item	Pearson Correlation	-,147	,010
	Sig. (2-tailed)	,097	,907
	N	128	128
TypeR09IMP Relatietype:Evaluatief_ hele item	Pearson Correlation	-,081	-,192*
	Sig. (2-tailed)	,366	,030
	N	128	128
TypeR11IMP Relatietype:middel-doel_ hele item	Pearson Correlation	-,091	-,046
	Sig. (2-tailed)	,308	,606
	N	128	128
TypeR12IMP Relatietype:Sequentieel, willekeurige opsomming_ hele item	Pearson Correlation	.b	.b
	Sig. (2-tailed)	.	.
	N	128	128
TypeR13IMP Relatietype:Sequentieel, geordende lijst_ hele item	Pearson Correlation	-,183*	,055
	Sig. (2-tailed)	,039	,540
	N	128	128
TypeR14IMP Relatietype:Soort_ hele item	Pearson Correlation	,010	,003
	Sig. (2-tailed)	,907	,973
	N	128	128
TypeR15IMP Relatietype:Voorbeeld_ hele item	Pearson Correlation	-,200*	-,080
	Sig. (2-tailed)	,024	,367

	N	128	128
TypeR16IMP Relatietype:Temporeel_ hele item	Pearson Correlation	-,010	-,149
	Sig. (2-tailed)	,912	,093
	N	128	128
TypeR17IMP Relatietype:Functionele relatie_ hele item	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
TypeR18IMP Relatietype:onderbouwend argument_ hele item	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
TypeR19IMP Relatietype:Contrasterend Argumentatie_ hele item	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
TypeR20IMP Relatietype:Resultaat_ hele item	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
TypeR21IMP Relatietype:toe_ hele item	Pearson Correlation	,046	-,078
	Sig. (2-tailed)	,604	,381
	N	128	128
TypeR22IMP Relatietype:In toevoeging tot (additief)_ hele item	Pearson Correlation	-,044	-,222[*]
	Sig. (2-tailed)	,625	,012
	N	128	128
TypeR23IMP Relatietype:comparatief-vergelijkend_ hele item	Pearson Correlation	-,049	-,151
	Sig. (2-tailed)	,585	,089
	N	128	128
TypeR01NIMP Relatietype:Actor noodz	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
TypeR02NIMP Relatietype:Bron noodz	Pearson Correlation	-,040	,119
	Sig. (2-tailed)	,656	,182
	N	128	128
TypeR03NIMP Relatietype:Brononderbouwing noodz	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
TypeR04NIMP Relatietype:conditionele relatie noodz	Pearson Correlation	-,063	-,001
	Sig. (2-tailed)	,477	,993
	N	128	128
TypeR05NIMP Relatietype:Conclusie noodz	Pearson Correlation	-,122	-,092
	Sig. (2-tailed)	,169	,302
	N	128	128
TypeR06NIMP Relatietype:Contrasterende relatie noodz	Pearson Correlation	-,145	-,033
	Sig. (2-tailed)	,103	,714
	N	128	128
TypeR07NIMP Relatietype:Def noodz	Pearson Correlation	-,129	,054
	Sig. (2-tailed)	,148	,548
	N	128	128
TypeR08NIMP Relatietype:Eff noodz	Pearson Correlation	-,071	-,050
	Sig. (2-tailed)	,427	,576
	N	128	128
TypeR09NIMP Relatietype:Evaluatief noodz	Pearson Correlation	-,163	-,024
	Sig. (2-tailed)	,066	,789
	N	128	128
TypeR11NIMP Relatietype:middel-doel noodz	Pearson Correlation	-,055	-,114
	Sig. (2-tailed)	,537	,199

	N	128	128
TypeR12NIMP Relatietype:Sequentieel, willekeurige opsomming noodz	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
TypeR13NIMP Relatietype:Sequentieel, geordende lijst noodz	Pearson Correlation	,093	,025
	Sig. (2-tailed)	,296	,778
	N	128	128
TypeR14NIMP Relatietype:Soort noodz	Pearson Correlation	-,003	-,118
	Sig. (2-tailed)	,977	,183
	N	128	128
TypeR15NIMP Relatietype:Voorbeeld noodz	Pearson Correlation	-,214*	-,015
	Sig. (2-tailed)	,015	,865
	N	128	128
TypeR16NIMP Relatietype:Temporeel noodz	Pearson Correlation	,037	,002
	Sig. (2-tailed)	,682	,985
	N	128	128
TypeR17NIMP Relatietype:Functionele relatie noodz	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
TypeR18NIMP Relatietype:onderbouwend argument noodz	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
TypeR19NIMP Relatietype:Contrasterend Argumentatie noodz	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
TypeR20NIMP Relatietype:Resultaat noodz	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
TypeR21NIMP Relatietype:toe noodz	Pearson Correlation	,060	-,052
	Sig. (2-tailed)	,502	,559
	N	128	128
TypeR22NIMP Relatietype:In toevoeging tot (additief)noodz	Pearson Correlation	,022	-,232**
	Sig. (2-tailed)	,804	,008
	N	128	128
TypeR23NIMP Relatietype:comparatief-vergelijkend noodz	Pearson Correlation	-,117	-,142
	Sig. (2-tailed)	,190	,109
	N	128	128
Infotype1IMP Info-element: Personen -impliciet	Pearson Correlation	-,043	,186*
	Sig. (2-tailed)	,630	,036
	N	128	128
Infotype2IMP Info-element: Planten en dieren -impliciet	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype3IMP Info-element: Gebruiksvoorwerp-impliciet	Pearson Correlation	,072	,095
	Sig. (2-tailed)	,421	,287
	N	128	128
Infotype4IMP Info-element: Concrete substanties-impliciet	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype5IMP Info-element: Voeding en verzorging-impliciet	Pearson Correlation	-,005	-,016
	Sig. (2-tailed)	,957	,854
	N	128	128
Infotype6IMP Info-element: Concreet overig-impliciet	Pearson Correlation	-,098	,029
	Sig. (2-tailed)	,273	,748

	N	128	128
Infotype7IMP Info-element: Concreet gebeuren-impliciet	Pearson Correlation	-,125	,129
	Sig. (2-tailed)	,161	,147
	N	128	128
Infotype8IMP Info-element: Plaats-impliciet	Pearson Correlation	,019	,009
	Sig. (2-tailed)	,828	,923
	N	128	128
Infotype9IMP Info-element: Tijd-impliciet	Pearson Correlation	-,042	-,152
	Sig. (2-tailed)	,641	,087
	N	128	128
Infotype11IMP Info-element: Abstracte substanties-impliciet	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype12IMP Info-element: Abstract gebeuren-impliciet	Pearson Correlation	-,245**	,016
	Sig. (2-tailed)	,005	,854
	N	128	128
Infotype13IMP Info-element: Organisatie-impliciet	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype14IMP Info-element: Abstract overig-impliciet	Pearson Correlation	-,107	,104
	Sig. (2-tailed)	,230	,243
	N	128	128
Infotype21IMP Info-element: Direct waarneembare kenmerken van personen doodsbleek, dwergachtig-impliciet	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype22IMP Info-element: Emotionele kenmerken en sociaal gedrag gegriefd, goedgelovig-impliciet	Pearson Correlation	,011	-,073
	Sig. (2-tailed)	,899	,412
	N	128	128
Infotype23IMP Info-element: Direct waarneembare kenmerken van dingen flanellen, geel-impliciet	Pearson Correlation	-,193*	,077
	Sig. (2-tailed)	,029	,390
	N	128	128
Infotype24IMP Info-element: Niet-direct waarneembare kenmerken teerarm, kiemvrij-impliciet	Pearson Correlation	-,200*	,012
	Sig. (2-tailed)	,023	,892
	N	128	128
Infotype25IMP Info-element: Tijd voorbijgaand, vrijdags-impliciet	Pearson Correlation	-,193*	,077
	Sig. (2-tailed)	,029	,390
	N	128	128
Infotype26IMP Info-element: Plaats binnenlands, Gelders-impliciet	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype27IMP Info-element: Specifieke evaluatie (positief/negatief) onverslijtbaar; lawaaierig-impliciet	Pearson Correlation	,022	,041
	Sig. (2-tailed)	,805	,650
	N	128	128
Infotype28IMP Info-element: Algemene evaluatie (positief/negatief/zonder richting) mooi; verwerpelijk; aanmerkelijk-impliciet	Pearson Correlation	,036	,243**
	Sig. (2-tailed)	,684	,006
	N	128	128
Infotype29IMP Info-element: Epistemische evaluatie (positief/negatief) steekhoudend; onzinnig-impliciet	Pearson Correlation	-,112	-,150
	Sig. (2-tailed)	,207	,090
	N	128	128
Infotype30IMP Info-element: Overige (niet-evaluatieve) abstracte adjectieven aanverwant, aandachtig-impliciet	Pearson Correlation	-,075	,009
	Sig. (2-tailed)	,400	,921
	N	128	128
Infotype31IMP Algemene evaluatie (zonder richting) mooi; verwerpelijk; aanmerkelijk-impliciet	Pearson Correlation	-,069	-,019
	Sig. (2-tailed)	,439	,834

	N	128	128
Infotype32IMP Epistemische evaluatie (positief/negatief) steekhoudend; onzinnig-impliciet	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype33IMP Epistemische evaluatie (negatief) steekhoudend; onzinnig-impliciet	Pearson Correlation	,047	-,008
	Sig. (2-tailed)	,596	,932
	N	128	128
Infotype34IMP Overige (niet-evaluatieve) abstracte adjectieven aanverwant, aandachtig-impliciet	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype35IMP Ongedefinieerd belastbaar, druk, smal-impliciet	Pearson Correlation	-,064	-,172
	Sig. (2-tailed)	,473	,053
	N	128	128
Infotype1NDZIMP Info-element: Personen -NDZIMP	Pearson Correlation	-,149	,203*
	Sig. (2-tailed)	,092	,021
	N	128	128
Infotype2NDZIMP Info-element: Planten en dieren -NDZIMP	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype3NDZIMP Info-element: Gebruiksvoorwerp-NDZIMP	Pearson Correlation	-,018	,072
	Sig. (2-tailed)	,838	,421
	N	128	128
Infotype4NDZIMP Info-element: Concrete substanties-NDZIMP	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype5NDZIMP Info-element: Voeding en verzorging-NDZIMP	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype6NDZIMP Info-element: Concreet overig-NDZIMP	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype7NDZIMP Info-element: Concreet gebeuren-NDZIMP	Pearson Correlation	-,232**	,102
	Sig. (2-tailed)	,008	,254
	N	128	128
Infotype8NDZIMP Info-element: Plaats-NDZIMP	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype9NDZIMP Info-element: Tijd-NDZIMP	Pearson Correlation	,000	-,114
	Sig. (2-tailed)	,996	,201
	N	128	128
Infotype11NDZIMP Info-element: Abstracte substanties-NDZIMP	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype12NDZIMP Info-element: Abstract gebeuren-NDZIMP	Pearson Correlation	-,106	-,010
	Sig. (2-tailed)	,232	,913
	N	128	128
Infotype13NDZIMP Info-element: Organisatie-NDZIMP	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype14NDZIMP Info-element: Abstract overig-NDZIMP	Pearson Correlation	-,004	-,083
	Sig. (2-tailed)	,963	,351
	N	128	128
Infotype21NDZIMP Info-element: Direct waarneembare kenmerken van personen doodsbleek, dwergachtig-NDZIMP	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.

	N	128	128
Infotype22NDZIMP Info-element: Emotionele kenmerken en sociaal gedrag gegriefd, goedgelovig-NDZIMP	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype23NDZIMP Info-element: Direct waarneembare kenmerken van dingen flanellen, geel-NDZIMP	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype24NDZIMP Info-element: Niet-direct waarneembare kenmerken teerarm, kiemvrij-NDZIMP	Pearson Correlation	-,117	-,079
	Sig. (2-tailed)	,187	,378
	N	128	128
Infotype25NDZIMP Info-element: Tijd voorbijgaand, vrijdags-NDZIMP	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype26NDZIMP Info-element: Plaats binnenlands, Gelders-NDZIMP	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype27NDZIMP Info-element: Specifieke evaluatie (positief/negatief) onverslijtbaar; lawaaierig-NDZIMP	Pearson Correlation	-,079	,031
	Sig. (2-tailed)	,373	,730
	N	128	128
Infotype28NDZIMP Info-element: Algemene evaluatie (positief/negatief/zonder richting) mooi; verwerpelijk; aanmerkelijk-NDZIMP	Pearson Correlation	,154	,177*
	Sig. (2-tailed)	,082	,045
	N	128	128
Infotype29NDZIMP Info-element: Epistemische evaluatie (positief/negatief) steekhoudend; onzinnig-NDZIMP	Pearson Correlation	-,294**	-,014
	Sig. (2-tailed)	,001	,879
	N	128	128
Infotype30NDZIMP Info-element: Overige (niet-evaluatieve) abstracte adjectieven aanverwant, aandachtig-NDZIMP	Pearson Correlation	,039	,055
	Sig. (2-tailed)	,661	,538
	N	128	128
Infotype31NDZIMP Algemene evaluatie (zonder richting) mooi; verwerpelijk; aanmerkelijk-NDZIMP	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype32NDZIMP Epistemische evaluatie (positief/negatief) steekhoudend; onzinnig-NDZIMP	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype33NDZIMP Epistemische evaluatie (negatief) steekhoudend; onzinnig-NDZIMP	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype34NDZIMP Overige (niet-evaluatieve) abstracte adjectieven aanverwant, aandachtig-NDZIMP	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype35NDZIMP Ongedefinieerd belastbaar, druk, smal-NDZIMP	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype1AFLIMP Info-element: Personen -AFLIMP	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype2AFLIMP Info-element: Planten en dieren -AFLIMP	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype3AFLIMP Info-element: Gebruiksvoorwerp-AFLIMP	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype4AFLIMP Info-element: Concrete substanties-AFLIMP	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.

	N	128	128
Infotype5AFLIMP Info-element: Voeding en verzorging-AFLIMP	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype6AFLIMP Info-element: Concreet overig-AFLIMP	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype7AFLIMP Info-element: Concreet gebeuren-AFLIMP	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype8AFLIMP Info-element: Plaats-AFLIMP	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype9AFLIMP Info-element: Tijd-AFLIMP	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype11AFLIMP Info-element: Abstracte substanties-AFLIMP	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype12AFLIMP Info-element: Abstract gebeuren-AFLIMP	Pearson Correlation	,008	-,033
	Sig. (2-tailed)	,927	,709
	N	128	128
Infotype13AFLIMP Info-element: Organisatie-AFLIMP	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype14AFLIMP Info-element: Abstract overig-AFLIMP	Pearson Correlation	,056	,054
	Sig. (2-tailed)	,527	,548
	N	128	128
Infotype21AFLIMP Info-element: Direct waarneembare kenmerken van personen doodsbleek, dwergachtig-AFLIMP	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype22AFLIMP Info-element: Emotionele kenmerken en sociaal gedrag gegriefd, goedgelovig-AFLIMP	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype23AFLIMP Info-element: Direct waarneembare kenmerken van dingen flanellen, geel-AFLIMP	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype24AFLIMP Info-element: Niet-direct waarneembare kenmerken teerarm, kiemvrij-AFLIMP	Pearson Correlation	-,098	,029
	Sig. (2-tailed)	,273	,748
	N	128	128
Infotype25AFLIMP Info-element: Tijd voorbijgaand, vrijdags-AFLIMP	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype26AFLIMP Info-element: Plaats binnenlands, Gelders-AFLIMP	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype27AFLIMP Info-element: Specifieke evaluatie (positief/negatief) onverslijtbaar; lawaaierig-AFLIMP	Pearson Correlation	,012	,049
	Sig. (2-tailed)	,894	,579
	N	128	128
Infotype28AFLIMP Info-element: Algemene evaluatie (positief/negatief/zonder richting) mooi; verwerpelijk; aanmerkelijk-AFLIMP	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype29AFLIMP Info-element: Epistemische evaluatie (positief/negatief) steekhoudend; onzinnig-AFLIMP	Pearson Correlation	,046	-,038
	Sig. (2-tailed)	,609	,672

	N	128	128
Infotype30AFLIMP Info-element: Overige (niet-evaluatieve) abstracte adjectieven aanverwant, aandachtig-AFLIMP	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype31AFLIMP Algemene evaluatie (zonder richting) mooi; verwerpelijk; aanmerkelijk-AFLIMP	Pearson Correlation	,033	,038
	Sig. (2-tailed)	,713	,670
	N	128	128
Infotype32AFLIMP Epistemische evaluatie (positief/negatief) steekhoudend; onzinnig-AFLIMP	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype33AFLIMP Epistemische evaluatie (negatief) steekhoudend; onzinnig-AFLIMP	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype34AFLIMP Overige (niet-evaluatieve) abstracte adjectieven aanverwant, aandachtig-AFLIMP	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
Infotype35AFLIMP Ongedefinieerd belastbaar, druk, smal-AFLIMP	Pearson Correlation	.[b]	.[b]
	Sig. (2-tailed)	.	.
	N	128	128
NDIFRIMP aantal verschillende IMPLICIETE relaties tussen info-elementen in de opgave	Pearson Correlation	-,245**	-,024
	Sig. (2-tailed)	,005	,787
	N	128	128
NDIFRNIMP aantal verschillende IMPLICIETE relaties tussen noodzakelijke info-elementen in de opgave	Pearson Correlation	-,250**	,003
	Sig. (2-tailed)	,004	,970
	N	128	128
NinfoIMP aantal IMPLICIETE informatie-elementen bij de opgave	Pearson Correlation	-,267**	,094
	Sig. (2-tailed)	,002	,289
	N	128	128
NinfoNDZIMP aantal IMPLICIETE informatie-elementen noodzakelijk voor vinden van het goede antwoord	Pearson Correlation	-,258**	,029
	Sig. (2-tailed)	,003	,743
	N	128	128
NinfoAFLIMP aantal IMPLICIETE informatie-elementen die toeleiden tot de afleiders	Pearson Correlation	,043	,045
	Sig. (2-tailed)	,630	,614
	N	128	128
NinfoPRSL aantal sterk centraal staande informatie-elementen noodzakelijk voor de sleutel	Pearson Correlation	-,242**	-,030
	Sig. (2-tailed)	,006	,734
	N	129	129
NinfoPRO aantal sterk centraal staande informatie-elementen bij de opgave	Pearson Correlation	-,231**	-,034
	Sig. (2-tailed)	,009	,704
	N	129	129

Info-elementen gecombineerd Strikt en ruim concreet_Hele item	Pearson Correlation	-.127	.139
	Sig. (2-tailed)	.155	.120
	N	127	127
Info-elementen gecombineerd Ruim concreet_Hele item	Pearson Correlation	.002	.012
	Sig. (2-tailed)	.984	.898
	N	127	127
Info-elementen gecombineerd Abstract_Hele item	Pearson Correlation	-.224*	.009
	Sig. (2-tailed)	.011	.924
	N	127	127
Info-elementen gecombineerd Strikt en ruim concreet_Expliciet	Pearson Correlation	-.126	.125
	Sig. (2-tailed)	.158	.161
	N	127	127

Info-elementen gecombineerd Ruim concreet_Expliciet	Pearson Correlation	.009	.041
	Sig. (2-tailed)	.921	.644
	N	127	127
Info-elementen gecombineerd Abstract_Expliciet	Pearson Correlation	-.205*	-.019
	Sig. (2-tailed)	.021	.836
	N	127	127
Info-elementen gecombineerd Strikt en ruim concreet_Noodzakelijk	Pearson Correlation	-.311**	.087
	Sig. (2-tailed)	.000	.332
	N	127	127
Info-elementen gecombineerd Ruim concreet_Noodzakelijk	Pearson Correlation	-.079	-.033
	Sig. (2-tailed)	.377	.709
	N	127	127
Info-elementen gecombineerd Abstract_Noodzakelijk	Pearson Correlation	-.171	-.150
	Sig. (2-tailed)	.054	.091
	N	127	127
Info-elementen gecombineerd Strikt en ruim concreet_Afleiders	Pearson Correlation	.102	-.041
	Sig. (2-tailed)	.252	.644
	N	127	127
Info-elementen gecombineerd Ruim concreet_Afleiders	Pearson Correlation	-.108	-.046
	Sig. (2-tailed)	.228	.611
	N	127	127
Info-elementen gecombineerd Abstract_Afleiders	Pearson Correlation	.034	-.041
	Sig. (2-tailed)	.705	.651
	N	127	127
Info-elementen gecombineerd Strikt en ruim concreet_NDZEX	Pearson Correlation	-.298**	.052
	Sig. (2-tailed)	.001	.564
	N	127	127
Info-elementen gecombineerd Ruim concreet_NDZEX	Pearson Correlation	-.114	.024
	Sig. (2-tailed)	.203	.785
	N	127	127
Info-elementen gecombineerd Abstract_NDZEX	Pearson Correlation	-.168	-.149
	Sig. (2-tailed)	.059	.095
	N	127	127
Info-elementen gecombineerd Strikt en ruim concreet_AFLEX	Pearson Correlation	.102	-.041
	Sig. (2-tailed)	.252	.644
	N	127	127
Info-elementen gecombineerd Ruim concreet_AFLEX	Pearson Correlation	-.108	-.046
	Sig. (2-tailed)	.228	.611
	N	127	127
Info-elementen gecombineerd Abstract_AFLEX	Pearson Correlation	.021	-.052
	Sig. (2-tailed)	.815	.562
	N	127	127

Totaal aantal expliciete informatie-elementen_Hele item	Pearson Correlation	-.185*	.012
	Sig. (2-tailed)	.037	.895
	N	127	127
Totaal aantal impliciete informatie-elementen_Hele item	Pearson Correlation	-.244**	.098
	Sig. (2-tailed)	.006	.274
	N	127	127
Totaal aantal noodzakelijke relaties	Pearson Correlation	-.260**	-.042
	Sig. (2-tailed)	.003	.635
	N	127	127
Totaal aantal expliciete noodzakelijke relaties	Pearson Correlation	-.225*	-.025
	Sig. (2-tailed)	.011	.783

	N	127	127
Totaal aantal impliciete noodzakelijke relaties	Pearson Correlation	-.211*	-.069
	Sig. (2-tailed)	.017	.440
	N	127	127
Proportie expliciete informatie-elementen_Hele item	Pearson Correlation	.106	-.114
	Sig. (2-tailed)	.233	.200
	N	127	127
Totaal aantal noodzakelijke informatie-elementen	Pearson Correlation	-.310**	-.103
	Sig. (2-tailed)	.000	.251
	N	127	127
Totaal aantal expliciete noodzakelijke informatie-elementen	Pearson Correlation	-.313**	-.124
	Sig. (2-tailed)	.000	.165
	N	127	127
Totaal aantal informatie-elementen_Afleiders	Pearson Correlation	.010	-.045
	Sig. (2-tailed)	.914	.614
	N	127	127
Proportie noodzakelijke informatie-elementen uit hele item	Pearson Correlation	.062	-.109
	Sig. (2-tailed)	.490	.221
	N	127	127
Totaal aantal impliciete noodzakelijke informatie-elementen	Pearson Correlation	-.145	.001
	Sig. (2-tailed)	.104	.990
	N	127	127
Proportie noodzakelijke relaties uit hele item	Pearson Correlation	.079	-.055
	Sig. (2-tailed)	.377	.537
	N	127	127

Proportie impliciete informatie-elementen hele item	Pearson Correlation	-.106	.114
	Sig. (2-tailed)	.233	.200
	N	127	127

InfotypeConcreet	Pearson Correlation	-.123	.140
	Sig. (2-tailed)	.165	.116
	N	128	128
InfotypeRuimConcreet	Pearson Correlation	.001	.011
	Sig. (2-tailed)	.990	.899
	N	128	128
InfotypeAbstract	Pearson Correlation	-.191*	.017
	Sig. (2-tailed)	.030	.845
	N	128	128
InfotypeConcreetEX	Pearson Correlation	-.122	.126
	Sig. (2-tailed)	.171	.156
	N	128	128
InfotypeRuimConcreetEX	Pearson Correlation	.009	.041
	Sig. (2-tailed)	.924	.644
	N	128	128
InfotypeAbstractEX	Pearson Correlation	-.174*	-.009
	Sig. (2-tailed)	.050	.919
	N	128	128
InfotypeConcreetNDZ	Pearson Correlation	-.314**	.085
	Sig. (2-tailed)	.000	.341
	N	128	128
InfotypeRuimConcreetNDZ	Pearson Correlation	-.081	-.034
	Sig. (2-tailed)	.361	.699
	N	128	128

InfotypeAbstractNDZ	Pearson Correlation	-.161	-.146
	Sig. (2-tailed)	.069	.099
	N	128	128
InfotypeConcreetAFL	Pearson Correlation	.099	-.042
	Sig. (2-tailed)	.266	.635
	N	128	128
InfotypeRuimConcreetAFL	Pearson Correlation	-.109	-.046
	Sig. (2-tailed)	.223	.606
	N	128	128
InfotypeAbstractAFL	Pearson Correlation	.028	-.042
	Sig. (2-tailed)	.750	.634
	N	128	128
InfotypeConcreetNDZEX	Pearson Correlation	-.301**	.050
	Sig. (2-tailed)	.001	.577
	N	128	128
InfotypeRuimConcreetNDZEX	Pearson Correlation	-.116	.023
	Sig. (2-tailed)	.192	.795
	N	128	128
InfotypeAbstractNDZEX	Pearson Correlation	-.157	-.144
	Sig. (2-tailed)	.076	.104
	N	128	128
InfotypeConcreetAFLEX	Pearson Correlation	.099	-.042
	Sig. (2-tailed)	.266	.635
	N	128	128
InfotypeRuimConcreetAFLEX	Pearson Correlation	-.109	-.046
	Sig. (2-tailed)	.223	.606
	N	128	128
InfotypeAbstractAFLEX	Pearson Correlation	.016	-.054
	Sig. (2-tailed)	.859	.547
	N	128	128

aantal expliciete informatie-elementen bij de opgave	Pearson Correlation	-.106	.000
	Sig. (2-tailed)	.234	.999
	N	128	128
NInfoIMPL	Pearson Correlation	-.227*	.102
	Sig. (2-tailed)	.010	.254
	N	128	128
NRelaNDZ	Pearson Correlation	-.257**	-.042
	Sig. (2-tailed)	.003	.639
	N	128	128
NRelaNdzEx	Pearson Correlation	-.221*	-.023
	Sig. (2-tailed)	.012	.794
	N	128	128
NRelaNdzIMPL	Pearson Correlation	-.215*	-.071
	Sig. (2-tailed)	.015	.427
	N	128	128
PropInfoEX	Pearson Correlation	.288**	.021
	Sig. (2-tailed)	.001	.812
	N	128	128
aantal informatie-elementen nnodzakelijk voor vinden van het goede antwoord	Pearson Correlation	-.306**	-.102
	Sig. (2-tailed)	.000	.253
	N	128	128
aantal expliciete informatie-elementen noodzakelijk voor vinden van het goede antwoord	Pearson Correlation	-.309**	-.123
	Sig. (2-tailed)	.000	.167

	N	128	128
NInfoAFL	Pearson Correlation	.003	-.048
	Sig. (2-tailed)	.972	.594
	N	128	128
PropInfoNDZ	Pearson Correlation	.053	-.112
	Sig. (2-tailed)	.551	.208
	N	128	128
NInfoNdzIMPL	Pearson Correlation	-.144	.001
	Sig. (2-tailed)	.105	.990
	N	128	128
PropRNDZ	Pearson Correlation	.072	-.058
	Sig. (2-tailed)	.421	.518
	N	128	128
PropInfoImpl	Pearson Correlation	-.107	.115
	Sig. (2-tailed)	.231	.197
	N	128	128
NRelaIMPL	Pearson Correlation	-.226*	.027
	Sig. (2-tailed)	.010	.761
	N	128	128
NRelaEX	Pearson Correlation	-.125	.031
	Sig. (2-tailed)	.161	.728
	N	128	128
PropRelaEX	Pearson Correlation	.114	.046
	Sig. (2-tailed)	.199	.607
	N	128	128

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Appendix 5: Results of one-way analysis of variance for text-level variance in terms of difficulty and discriminatory power

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
GemP	Between Groups	10853.680	22	493.349	1.182	.280
	Within Groups	43812.621	105	417.263		
	Total	54666.301	127			
GemRIR	Between Groups	4567.377	22	207.608	2.174	.005
	Within Groups	10027.606	105	95.501		
	Total	14594.983	127			