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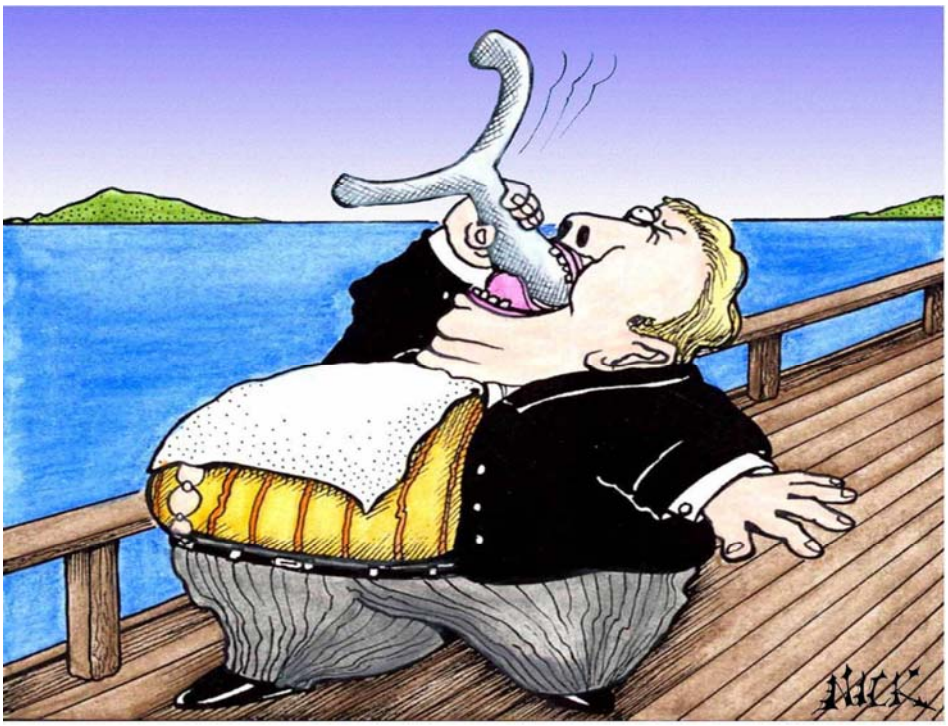
The unriddling of metalinguistic awareness in early adolescence

An investigation of riddle comprehension and appreciation of young adolescents attending different grades and school tracks



A great white man eating shark.

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Title page

Title:	The unriddling of metalinguistic awareness in early adolescence: An investigation of riddle comprehension and appreciation of young adolescents attending different grades and school tracks
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Abstract

Students who possess large vocabularies and good metacognitive and metalinguistic knowledge and skills, are known to run smaller risks of unsuccessful school and societal careers. In view of the existing literacy arrears that have been ascertained in adolescence, it is meaningful to investigate the subskills underlying adolescent literacy development. So far, little research effort has been devoted to the metalinguistic awareness of young adolescents. Therefore, this study explores the phenomenon of metalinguistic awareness in early adolescence. It investigates riddle comprehension and appreciation of young adolescents attending different grades and school tracks. 91 Young adolescents in 7th and 9th grade of the vocational or pre-academic school track were presented with a series of riddles, which varied in metalinguistic difficulty to test for comprehension and appreciation. Comprehension was measured by analysing the participants' explanations of the riddles in terms of completeness and the type of knowledge used for comprehension. Riddle appreciation was measured in terms of appreciation marks. In addition, the participants' reading vocabulary was assessed and data on reading behaviour and world knowledge were collected. The study reveals that metalinguistic awareness develops differently across different types of young adolescents. Pre-academic students appear to have better metalinguistic awareness than vocational students. With respect to development, the study reveals that the metalinguistic awareness of pre-academic students increases in early adolescence, whereas the development of metalinguistic awareness of vocational students stagnates in early adolescence. Multiple regression analyses revealed that the variance in riddle comprehension, and as such the variance in metalinguistic awareness, can be explained by the school track (academic skills), and the grade (age) which young adolescents attend, and by the reading vocabulary that young adolescents possess in early adolescence. In sum, the present study indicates that vocational students, in particular, run the risk of unsuccessful literacy development and related unsuccessful societal careers as a result of stagnation of metalinguistic awareness and vocabulary growth. As such, the present study makes an urgent appeal for more instruction in the structure of language and vocabulary, particularly in the first grades of vocational secondary education.

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Ilona de Milliano

Contents

1 Introduction

Literacy is a major societal and educational concern across the world, since it is of enormous importance for the future professional careers of children and adolescents and for their well-being as citizens of their society. In this respect, literacy is defined by the United Nations Educational, Scientific and Cultural Organization (UNESCO) as "the ability to identify, understand, interpret, create, communicate and compute using printed and written materials associated with varying contexts. Literacy involves a continuum of learning to enable an individual to achieve his or her goals, to develop his or her knowledge and potential, and to participate fully in the wider society". Adolescent is used by the World Health Organization (WHO) to refer to children between 10 and 19 years of age. Policy makers and educators are concerned about literacy, because unsuccessful development of literacy may cause school careers, professional careers, and even societal careers, to fail. Unfortunately, this scenario seems to be waiting for more adolescents, considering the numerous national and international comparative studies reporting that the literacy development of large groups of adolescents lags behind (Elley, 1992; OECD, 2001; Dagevos et al., 2003; Hacquebord, 2004; Educational Quality and Accountability Office, 2005). In spite of the clear signals of underachievement, loss of motivation and drop-out in the adolescent school period, research into adolescent literacy development is scarce (Curtis, 2002; Van Gelderen et al., 2007). Therefore, this study aims to contribute to our understanding of adolescent literacy development.

Students who possess large vocabularies and good metacognitive and metalinguistic knowledge and skills, are known to run smaller risks of unsuccessful school and societal careers. In view of the existing literacy arrears that have been ascertained in adolescence, it is meaningful to investigate the subskills underlying adolescent literacy development. As up to now only little is known about the metalinguistic awareness of young adolescents, the present study explored the phenomenon of metalinguistic awareness in early adolescence.

According to numerous researchers are language skills, and metacognitive and metalinguistic knowledge and skills the core literacy skills (Baker & Brown, 1984; Schoonen et al., 1998; Perfetti, 1999; Victori, 1999; Van Gelderen et al., 2003). As metalinguistic awareness has a strong relationship with language skills as with metacognitive knowledge and abilities. And so far, only little research effort has been devoted to the metalinguistic awareness of young adolescents, the present study explores the phenomenon of metalinguistic awareness in early adolescence. This way, the study contributes to our understanding of one of the major subskills of adolescent literacy.

Metalinguistic awareness concerns the knowledge about the functioning and characteristics of language and the ability to apply this knowledge during language processing. Riddle jokes have been used for the investigation of metacognitive activity and metalinguistic awareness (Shultz & Pilon, 1973; Shultz & Horibe, 1974; Yalisove, 1978; Gleitman et al., 1978; Kurvers, 1981; Bakker, 2003). A

riddle joke consists of simple question-and-answer patterns. Each riddle has a missing element, something that makes the answer difficult to guess, and a resolution element, something that makes the answer sensible (Shultz, 1974). For example:

Q: What dog keeps the best time?
A: A watch dog.

Riddles have different metacognitive and metalinguistic demands which are dependent on the kind of link between the question and the answer. In verbal joking riddles, the link is based on a language ambiguity, for which metalinguistic knowledge and skills are needed to resolve and appreciate this kind of riddle. Comprehension and appreciation of riddles requiring different levels of metalinguistic activity has proven to provide insight in metalinguistic awareness and cognitive development of children. Therefore, in this study, metalinguistic awareness is explored by investigating riddle comprehension and riddle appreciation of young adolescents. Because metalinguistic awareness is expected to be different for different groups of young adolescents, this study is focused on young adolescents from 7th and 9th graders attending the vocational or pre-academic school track. As such, the effect of grade and school track on metalinguistic awareness and its development in early adolescence is tested. In this way, the results of the study contribute to our understanding of metalinguistic awareness in early adolescence.

Before zooming in on the actual study, the reader is first informed on the theoretical and empirical background of investigating metacognitive and metalinguistic development. Therefore, chapter 2 presents core concepts that will be encountered in later chapters and introduces relevant theories and models on metacognitive and metalinguistic development. Subsequently, the rationale for investigating metacognitive and metalinguistic development by using humour and, in particular, riddles is presented. This is followed by a review on studies investigating the developments with children from different ages. Finally, the tested hypotheses are presented. As such, chapter 2 motivates the purpose and method of this study. In chapter 3, the design of this study is explained into more detail. First, the young adolescents that have participated in the study are introduced. Then, it presents the stimuli and the experimental procedure. Finally, the scoring systems and the statistical approach are discussed. Chapter 4 reports the results of this study in the light of the hypotheses stated in chapter 2. First, the data on linguistic competence, reading behaviour and world knowledge are discussed. Then, the results on riddle comprehension and riddle appreciation are presented and discussed in relation to the data on linguistic competence, reading behaviour and world knowledge. In the final chapter, the results of the study are discussed and compared with those of the studies reviewed in chapter 2. Following this, the main conclusions from this study are presented. Finally, pedagogical implications on the promotion of metalinguistic awareness in early adolescence and starting points for future research are presented.

2 Theoretical and empirical background

A decent investigation of young adolescent's metalinguistic awareness and its development starts with an introduction of the core concepts and an overview of the theoretical and empirical background. Therefore, this chapter starts with the embedding of metalinguistic awareness in the context of metacognition and learning. Then, definitions of concepts dealing with metalinguistic knowledge and abilities are presented, followed by an explanation of the definitions used in this study. Next, current theories and models on metalinguistic development are explained, followed by several considerations regarding the methods for investigating metalinguistics. Subsequently, section 2.2 deals with the rationale beyond using humour and riddles as appropriate and appealing instruments for investigating metacognitive and metalinguistic awareness and their development. The final sections of this chapter review studies using humour and riddles from which eventually starting points for further investigation are inferred. Finally, the hypotheses and the underlying rationale are presented. In this way, Chapter 2 motivates the purpose and method for this study.

2.1 Metacognition and metalinguistics

2.1.1 Metacognition

Metacognition is described by Flavell (1981) as 'cognition about cognition' (p. 37). This description may be interpreted in two ways: on the one hand it may refer to the knowledge of individuals of their own cognitive states and processes, and on the other hand, it may refer to the ability of individuals to use this knowledge and to manage their cognitive functioning. Gombert (1992) joins this ambivalence and defines metacognition as a field covering: 1) introspective, conscious knowledge possessed by particular individuals about their own cognitive states or processes (metacognitive knowledge) and, 2) the ability of these individuals to intentionally monitor and plan their own cognitive processes with the aim of realizing a deliberate goal or objective (metacognitive skills) (p. 13). From this definition it may be inferred that meta-activities only receive their status of 'meta' if they are consciously performed by the subject. Next to conscious cognitive activities, researchers recognize the existence of unconscious cognitive processes, which are referred to as so-called epiprocesses. Epiprocesses are inaccessible to consciousness and concern behaviour manifested from an early age which are, contrary to meta-activities, not consciously performed by the individual. This study, however, focuses on the cognitive processes that are accessible to individuals' consciousness. Furthermore, this study concentrates particularly on the domain of metacognition which may not be confused with the closely related domain of cognition. Compared to cognition, the scope of metacognition is more restricted as it is limited to the process of reflection and may therefore by no means be extended to the totality of cognitive processes at work in information processing (Gombert, 1992).

Metacognitive knowledge is knowledge about the functioning of individuals' own cognitive functioning. This concerns knowledge of individual's own observations, thinking, remembering, learning and reasoning, and that of other people. According to Simons (1995) it is generally assumed that people, who possess relatively much cognitive knowledge, are better controllers and guiders of their own cognition. As such, active control of cognition, learning processes and learning activities are supposed to lead to better learning. Furthermore, only people who know how thinking, learning and reasoning works, are considered being able taking correct decisions about their own thinking- and learning processes. This way, metacognitive knowledge may be viewed as a necessary, but insufficient, condition for active control of cognitive activities and related successful learning.

Frequently investigated meta-abilities are (Gombert, 1992):

- metalearning, which refers to the knowledge and control of the learning processes;
- meta-attention, which concerns the ability to pay attention consciously;
- social metacognition, which refers to knowledge of the cognitive processes at work in other people, along with their behavioural implications;
- metamemory, which concerns the ability to control one's own memory;
- metalinguistic ability, which refers to the knowledge and control of the linguistic processes.

Throughout the years, metamemory and metalinguistic ability are the most cited and studied meta-abilities. Studies have demonstrated that metacognitive knowledge, including metalinguistic knowledge, has a considerable impact on literacy skills of adolescents (Baker & Brown, 1984; Schoonen et al., 1998 and Victori, 1999). Therefore, this study aims at contributing to the understanding of adolescent literacy and is particularly directed at metalinguistic awareness in early adolescence.

2.1.2 Metalinguistics: awareness, knowledge and abilities

In this section the core concepts dealing with metalinguistics are discussed and concluded by the definitions applied in this study. Between 1950 and 1960 researchers started using the expression 'metalinguistics' to refer to activities associated with metalanguage. Metalanguage is used to refer to the language, whether normalized or formalized, to speak about language. In this linguistic activity, language itself is the object of study instead of being the medium by which things are studied. In theories and studies concerning metalinguistics, people use terms like metalinguistic awareness, -knowledge and -abilities. These concepts are strongly related and as such definitions regularly overlap.

The major point of disagreement concerns the issue whether metalinguistics is about the knowledge that people have on the characteristics and functioning of language or whether metalinguistics is simply part of our daily language use. Researchers as Chomsky (1979) and Downing (1979) describe

the field of metalinguistics as the individual's knowledge of the characteristics and functioning of language (Gombert, 1992). They view metalinguistic activity in terms of reflection on language, its nature and its functions. Other authors, including Cazden (1976) and Hakes (1980), characterize metalinguistic activity as a part of our daily language use, whether this is in terms of production or comprehension. In this view, metalinguistic activity is characterized by an intentional monitoring that the subject applies to the cognitive processes which are at work in language processing. Tunmer & Herriman (1984) have a similar view on metalinguistic awareness and define it as "the ability to reflect upon and manipulate the structural features of spoken language, treating language itself as an object of thought, as opposed to simply using the language system to comprehend and produce sentences" (p. 12). This definition is somewhat remarkable, since Tunmer and Herriman speak simultaneously of reflection on and manipulation of the structural characteristics of language and control of the cognitive processes implied in the processing of language. Since these authors do not make an explicit distinction between reflective and controlling activities, Gombert (1992) proposes to distinguish explicitly between those two different types of metalinguistic activity. Like Gombert (1992), also Bialystok (1991) distinguishes between the different types of metalinguistic activity. For Bialystok, metalinguistic activities include, on the one hand, the analytical activities concerned with linguistic knowledge which are performed by the subject, and on the other, the activities which control linguistic processes. According to Gombert, metalinguistic activities include: 1) activities of reflection on language and its use, and 2) the individual's ability intentionally to monitor and plan their own cognitive process with the aim of realizing a deliberate goal or objective.

In this study, metalinguistic awareness is viewed as the combination of metalinguistic knowledge and metalinguistic ability. Metalinguistic knowledge is referred to as the activities of reflection on language and its use. Metalinguistic ability is referred to as people's ability intentionally to monitor and plan their own language process with the aim of realizing a deliberate goal or objective. The term metalinguistics is used to refer to research activities concerning both types of metalinguistic awareness and its development.

2.1.3 Metalinguistic development

In this section insight is provided into metalinguistic development by discussing a few theories and models. Metalinguistic activities concern different aspects of language and may therefore not be interpreted as one entity. Gombert (1992) distinguishes six domains in which metalinguistic activities are executed: 1) metaphonology, 2) metalexis, 3) metasemantics, 4) metasyntax, 5) metapragmatics and 6) metatext[1]. For these domains, the extent and moment of development of metalinguistic knowledge and abilities are generally supposed to be different. Researchers, however, vary in their

[1] See Gombert (1992) for an extensive discussion of these domains.

view on the way and the moment on which metalinguistic awareness emerges. After reviewing the literature, Nesdale & Tunmer (1984) distinguished three visions on metalinguistic development:

1. **Metalinguistic awareness is an integral part of the process of language acquisition**
   For Clark & Anderson (1979, cited by Gombert, 1992) metalinguistic awareness is acquired early in life. Spontaneous speech repairs and language play are cited as primary evidence.

2. **Metalinguistic awareness is a new kind of linguistic functioning which is largely influenced by the development of other cognitive processes**
   According to this view, metalinguistic awareness emerges during middle childhood; the period from approximately 4 to 8 years of age. In this period, children develop the ability to reflect on structural characteristics of language and this is considered to be influenced by the development of the ability to control their own cognitive functioning. Therefore, metalinguistic abilities are considered developing after language abilities. Although there is considerable variation from study to study, many researchers have found strong evidence for consistent and applicable metalinguistic awareness by the age of 7 or 8 (Edwards & Kirkpatrick, 1999).

3. **Metalinguistic awareness is the result of exposure to formal schooling**
   Donaldson (1978, cited by Gombert, 1992) thinks that metalinguistic is an effect of learning acquired at school, particularly by learning to read. Learning to read and write is considered to be triggering certain metalinguistic functions. Some researchers (Morais et al. 1998; Kuvers, 2002) confirm this claim at least for phonological and metalexical awareness; while others (Karmiloff-Smith et al., 1999) indicate that the chain of causality is actually the other way around.

The second view seems to receive the most support based on empirical evidence, although this evidence is difficult to discriminate from evidence for the third view. In this respect, different attempts are made to formulate a theory on metalinguistic awareness and to model its development. A famous theory on metalinguistic awareness is proposed by Bialystok and Ryan (1985) and completed by Bialystok (1986, 1987, 1991 and 2001). In this theory, metalinguistic awareness is distinguished between the analysis of linguistic knowledge into explicitly structured categories on the one hand, and the cognitive control of the attentive procedures of selection and processing of specific linguistic information on the other. Next to that, Bialystok assigns the declarative and procedural aspects of metalinguistic awareness to different levels and proposes independence between those two aspects. According to this theory, metalinguistic awareness is a reflection of the combination of the growth of the two processing components and of the growth of cognition and

metacognition[2]. Criticism on this theory is dealing with the independence of the processing components. It is questioned whether these two components can actually be independent, since one first has to gather knowledge on structural characteristics of language before this knowledge can be integrated in language controlling processes. In respect of this discussion, it is interesting to analyse which kind of knowledge people use to execute metalinguistic tasks and to what extent this type of knowledge determines the achievement of the task.

Bialystok reports little on the development of metalinguistic awareness. Gombert (1992), on the contrary, has developed a model for the development of metalinguistic awareness that is primarily based on the Karmiloff-Smith's model of metacognition. According to Gombert, four stages of metalinguistic development can be distinguished:

1. **The acquisition of the first linguistic skills (from birth to 5 years of age)**
   In this stage, the first linguistic skills are established which are based on the example provided by adults. With the help of negative and positive feedback, inadequate productions are eliminated and adequate ones are reinforced. At this level the implicit knowledge used by the child is unconscious for both comprehension and production. At the end of this stage, the language use of children looks like adults' language use. Finally, this stage is viewed as the starting level of automation of language behaviour.

2. **The acquisition of epilinguistic control (5 or 6 years of age)**
   In the second stage, the implicit knowledge acquired during the first stage is organized and linked. As such, new knowledge is acquired which is considered to be leading to functional (unreflected) awareness of the system. This kind of awareness is considered being sufficient for daily oral language use.

3. **The acquisition of metalinguistic awareness (6 or 7 years of age)**
   In the third stage, the knowledge children have acquired in the first and second stage, shifts from the unconscious level to the consciousness level. This shift is considered to be strongly related to the emergence of concrete operational thinking (Piaget, 1967) and to the triggering effect that learning to read and write causes.

4. **The automation of the metaprocesses**
   Automation is considered to be the final stage in the active application of metacognitive strategies. Gombert (1992) distinguishes two types of automatic processes: the epiprocesses and the automated processes. In both cases the cognitive effort is applied unconsciously, but

[2] For a more detailed discussion and visualisation of Bialystok's theory on metalinguistic awareness see Bialystok (1985, 1986, 1987, 1991 and 2001).

the automated processes, in contrast to the epiprocesses, can always be replaced by metaprocesses if an obstacle impairs the automatic functioning of linguistic processing.

Analyzing Gombert's model on metalinguistic development a few things concerning particularly the fourth stage, remain unexplained. The first aspect demanding for clarification concerns the period in which the automation of the metaprocesses occurs. While for the other three stages time spans are indicated, no time span is indicated for the fourth stage. It is interesting, however, to know when the automation of the metaprocesses takes place and until which age this process continues. Furthermore, it remains unclear how the automation process develops and whether this development is similar for all individuals. This study starts from the point that metalinguistic awareness is a new kind of linguistic functioning that is substantially influenced by the control of other cognitive processes and, therefore, applies Gombert's model on the development of metalinguistic awareness.

Before zooming in on the operationalization of metalinguistic awareness, section 2.1 is concluded by several considerations regarding research into metalinguistics.

2.1.4 Research into metalinguistics

Metalinguistic activities are investigated, since insight in the functioning of metalinguistics is considered to be very valuable within the framework of many aspects of language use and learning. Speakers of language use their metalinguistic awareness for, for example, scoring 'slips of the tongue', deciphering an atypical form of speech or dialect, making puns or word jokes, resolving linguistic ambiguities, judging grammaticality or appropriateness, and deciding on deeper meanings or intentions from word choices of paralinguistic cues (Edwards & Kirkpatrick, 1999). More recently, attention has been focused on the role of metalinguistic awareness on second-language acquisition (Bialystok, 1991 and Bakker, 2003), emergent literacy (Ravid & Tolchinsky, 2002) and on the relation between metalinguistic awareness and reading proficiency (e.g.: Kurvers, 1981; Mahony & Mann, 1992; Muter & Snowling, 1998).

The study of metalinguistics is difficult, however, for at least three reasons. First, there is a philosophical issue concerning the interplay between language and cognition (Van Kleeck, 1984 as cited in Edwards & Kirkpatrick, 1999). In metalanguage, the linguistic and cognitive systems operate simultaneously by which it is difficult to establish precise boundaries. Next, the various parallel operating systems of metalinguistic knowledge (phonological, lexical, syntactic, etc.) complicate for researchers the domain of focus of their studies. Finally, researchers have methodological issues in studying metalinguistic development and diverse stimuli such as language comprehension, grammaticality and ambiguity judgements, and picture tasks have been used (Edwards & Kirkpatrick, 1999). Apparently, it is not totally clear what the methods of research should be. Yet, one approach is to strive after natural speech acts and simultaneity of the stimuli. Headed by Karmiloff-Smith et al.

(1996) a group of researchers is convinced that a person's metalinguistic awareness should be judged in natural settings in which the person is producing or comprehending language while making decisions about what is being perceived. One type of stimuli that satisfies this condition for investigating linguistic awareness is testing the comprehension of riddles by asking persons to explain and appreciate them.

Consider the following riddle:

Q: What room can no one enter?
A: A mushroom.

This riddle is a good example of an authentic and playful speech act, and to comprehend, explain and appreciate it, different information processes have to be executed simultaneously. One has to interpret and reinterpret the semantic information provided by the question and the answer, since the listener has to figure out how the question or answer makes sense in terms of the original interpretation of the question. Because of the possibility for testing online metacognitive activity and other interesting characteristics, riddles are following several other studies also in this study, used for the investigation of metalinguistic development. Section 2.2 deals with a more extensive discussion on the rationale beyond using humour and riddles for the investigation of metacognitive and metalinguistic development.

2.2 Humour, riddles and metalinguistic development

2.2.1 Humour as topic of scientific interest

Since the nineteen sixties and seventies humour creation, comprehension and appreciation has become a serious matter for developmental psychologists, educators and linguists. In this respect, humour is generally used to refer to the ability or quality of people, objects or situations to evoke feelings of amusement and laughter in other people. Humour received scientific interest because of the cognitive and linguistic knowledge, and skills people need to master, to create, comprehend and appreciate humoristic utterances. By studying the different structures of humoristic utterances and its creation, comprehension and appreciation researchers aim to gain more insight in the cognitive and linguistic development of people. Humour in terms of its structure rather than its subject matter, came to be viewed as a useful and naturally occurring index of cognitive and linguistic growth (McGhee, 1971a). Next to that, humour is viewed as a promising instrument for investigation since it appeals to the domain of the playground in stead of that of the classroom. This way, it is controlled for differences in learning experience since the functioning of humour, including riddles, is not explicitly taught (Fowles & Glanz, 1976; Kurvers, 2004).

According to Raskin (1998, as cited in Marín-Arrese, 2003), there is a variety of theories which try to explain the mental processes that give rise to humour:

- Release theories, involving arousal-relief mechanisms (Freud, 1960; Mindness, 1971);
- Hostility theories which focus on disparagement strategies (Rapp, 1951; Gruner 1978, 1997);
- Incongruity-Resolution processes (Suls, 1972, Schultz, 1976; McGhee, 1979).

Especially, the principle of incongruity is a frequently occurring starting point for many studies. According to theorists as Kant (1790), Schopenhauer (1819), Freud (1960) as cited in Shultz (1976) incongruity is characterizing the structure of humour. Incongruity is usually defined as a conflict between what is expected and what actually occurs in the joke (Shultz, 1976, p. 12). The Incongruity-Resolution Theory presupposes that humour is created by a multistage process in which an initial incongruity is created, and then some further information causes that incongruity is resolved. According to Shultz, the mechanism of resolution is necessary to distinguish humour from nonsense. Whereas nonsense can be characterized as pure or irresolvable incongruity, humour can be characterized as resolvable or meaningful incongruity.

Consider the following examples of incongruity:

Humour		**Nonsense**
Q: What is the end of everything?	*versus*	*Q: What is the end of everything?*
A: The letter g.		*A: The letter e.*

At first, both answers do not seem to fit with the question. However, for the humorous example, the expectations set up by the question are disconfirmed by the answer, while the recipient remains confused in the nonsense example. In the humorous version, the incongruity can be resolved by noticing that a part of the material was ambiguous. The ambiguity in this case resides in the ambiguity of the question. After initially interpreting the question in terms of content, the listener later discovers that it could also be interpreted in terms of language structure. Reinterpretation for the nonsense example makes no sense, since the incongruity cannot be resolved by the given answer.

In view of several researchers, the mental processes that need to be executed to comprehend and appreciate humoristic utterances are closely related to cognitive development. For Piaget (1968, as cited in Fowles & Glanz, 1976), for instance, the primary mechanism for cognitive growth is accommodation in which people's cognitive structures are periodically reorganized to better account for observed reality. Piaget has noted the importance of conflictual and incongruous stimuli in provoking this critical restructuring. According to Piaget, children are surprised with events that

violate their expectations. Their expectations are determined by rules or norms abstracted from experience, and thus presuppose relevant cognitive structures. A surprising stimulus is a stimulus not in accordance with the child's current internal picture of reality. Such an unexpected stimulus must be reinterpreted to fit the rules, or the rule system must be revised or elaborated in order to incorporate the event. When restructuring of the system occurs, rather than assimilation of the novel stimulus, cognitive growth results. Thus, what one finds surprising (or amusing) is considered to depend on one's level of cognitive development.

This theory has led to investigations of cognitive aspects of the humour response in children. McGhee, for example, has conducted several studies (1971b; 1974) which established a clear relationship between humour comprehension and the child's stage of intellectual growth. Consequently, McGhee considers humour to be a function of the child's level of cognitive development. According to McGhee's theory, humour emerges when the capacity for fantasy and make-believe develops which is sometime late in the second year. Based upon Piaget's theory of development, McGhee proposes four stages of humour development to the age of 8 years:

1. **Incongruent acting with objects (approximately 18 to 24 months)**
   In the first stage at an age of approximately 18 to 24 months, children substitute one object for another.

2. **Incongruent labelling of objects (approximately 2 to 3 years of age)**
   In the second stage at an age of approximately 2 to 3 years, the first verbal jokes emerge. These jokes may seem very simple, though they represent a higher level of cognitive functioning. Children at this stage will be widely amused to call a dog a 'kitty' or a mommy a 'daddy'. Unlike stage 1 in which the object of humour must be present, the child no longer needs the presence of physical objects in order to make jokes.

3. **Conceptual incongruity (approximately 3 to 5 years of age)**
   At stage 3 at an age of approximately 3 to 5 years, the child requires a bit more distortion for a humorous effect because of the child's increase of word knowledge. The incongruity that causes humour at this stage is visual instead of logical. Preschool children, aged 2 to 5 years, do not understand humour based upon logical or conceptual incongruity yet.

4. **Multiple meanings and the first step towards mature humour (approximately 6 or 7 years of age)**
   Stage 4 at an age of approximately 6 or 7 years is characterized by the child's ability to understand double meanings that words and sentence may have.

Just like Piaget, McGhee assumes that between the age of 5 and 8 years there is a turning point in the development of humour. This turning point is considered to be closely related to the turning point in cognitive development caused by the acquisition of concrete operational thinking. Analyzing McGhee's model on humour development, comparable remarks as to Gombert's model on metalinguistic development, can be made. Also, for the development of humour it remains unclear what happens when children get older than the age of 8 years. It is unlikely that stage 4 is the final stage since McGhee actually indicates that stage four is only the first step towards mature humour. Therefore, it is interesting to investigate the shift of child humour to mature humour and to complete McGhee's model on humour development. In spite of the vagueness for (young) adolescents in McGhee's model, it is still interesting to continue studying the rationale beyond using humour for the investigation of metacognitive and metalinguistic development. Consequently, in section 2.2.2 the rationale for using riddles as operationalization of metacognitive awareness is described.

2.2.2 Riddles

Considering the incongruity principle of humour and that riddles are the favourite joke forms of children, researchers started using riddles as stimuli in their studies on cognitive development. At first sight, everyone seems to know what is meant when one is talking about riddles. In spite of that, theorists have difficulty in defining the phenomenon. The first striking aspect is that riddles mostly consist of two parts: a question and an answer. For example:

P1 *Q: What has four wheels and flies?*
P1 *A: A garbage truck.*

or

P1 *Q: What makes people bald-headed?*
P1 *A: Having no hair.*

However, this two-part structure is neither a necessary nor a sufficient condition. Not every question followed by an answer is a riddle. Consider for example:

P1 *Q: What time is it?*
P2 *A: Ten o'clock.*

or

P1 *Q: Where do you live?*
P2 *A: In Amsterdam.*

The second striking aspect is that the answer is usually given by the person who posed the question (P1) (Chiaro, 1992) and that this person expects (and hopes) that the other person (P2) does not know the answer to the question (Dienhart, 1998). For the non-riddles the other person (P2) does know the answer to the question posed by the other person (P1). Addition of this condition does not fix the definition problem, however. Teachers, for example, frequently pose question while knowing the answer already.

Generally, most theorists indicate that riddles have the form of question and answer, whereas the question is no real question. Shultz (1976) views riddles as a question followed by a surprising or

incongruous answer. Yalisove (1978) noted that riddles have both a missing element, something that makes the answer difficult to guess, and a resolution element, something that makes the answer sensible. Also, Dienhart (1998) stresses the two-part structure and thinks that riddles have an initial text, in which the riddle supplies a series of clues (generally insufficient or misleading) from which a second text is surmised by the recipient. In this study, the definition of riddles by Sutton-Smith (1976) is used which reads as follows: "the riddle is a puzzling question with an answer that seems arbitrary because the hearer receives meaning B in the riddle answer while expecting to react to meaning A in the riddle question; but the riddle question and answer are compatible because meanings A and B share some semantic relationship" (p. 118).

According to Kurvers (1981; 2004) riddles have specific rules that usually contravene logic and reasonable thinking. There is something illogic, something nonsensical, that at the same time has sense in terms of the joke. Thus, characteristic of the answer is its sense and absurdness at the same time. The humoristic effect results from the fact, that one realizes the answer is only sensible in the way that it is absurd in the bigger world of reality. How this sense in nonsense is created is comparable to other forms of humour, like jokes and cartoons. Thus, humour has everything to do with incongruity and its resolution.

Several researchers have collected a considerable amount of riddles to investigate the structure of riddles. Based on these analyses researchers have tried to distinguish categories by which the riddle collection could be structured in terms of cognitive demands. In this respect, Sutton-Smith (1976) supposed that different types of riddles demand for different levels of cognitive processing. As such, he made a categorization based on the cognitive theory of Piaget and distinguished between: 1) pre-riddles *(Q: Why did the man cop down the chimney? A: He needed the bricks)*, 2) implicit reclassifications (Q: Why did the dog go out into the sun? A: He wanted to be a hot dog), 3) riddle parodies *(Q: Why did the chicken cross the road? A: He wanted to get to the other side)*, 4) inverted relationships *(Q: What does one flea say to another as they go strolling? A: Shall we walk or take a dog?)*, 5) explicit reclassifications *(Q: What has an ear but cannot hear? A: Corn)* and 6) classification on the basis of noncriterial attributes *(Q: White inside and red outside? A: An apple)*.

Also, Yalisove (1978) made a classification based on the cognitive demands riddles require and distinguished between riddles that are based on conceptual tricks *(Q: Why do birds fly south? A: It's too far to walk)*, riddles based on linguistic ambiguity *(Q: What is black and white and re(a)d all over? A: A newspaper)*, and riddles based on absurdity *(Q: How can you fit six elephants into a VW? A: Three in the front and three in the back)*. Regarding the cognitive development issue, researchers became interested in how children of different ages and different levels of cognitive development respond to riddles of different cognitive complexity (McGhee, 1974, Prentice & Fathman, 1975 and Yalisove, 1978). Before zooming in on these studies, section 2.2.3 deals first with verbal riddles, since this riddle type is frequently used as operationalization of metalinguistic awareness.

2.2.3 Verbal riddles

Research into metacognition and metalinguistic awareness is united in research into the comprehension and appreciation of verbal humour, and verbal riddles in particular. Most verbal riddles play with a variety of linguistic ambiguities. The humorous incongruity of this kind of riddles is in the double meaning of words, phrases or sentences. Frequently, the joke is set up with the help of one interpretation: the first or most obvious interpretation, while actually the other interpretation is appealed for; the second or less obvious interpretation. The incongruity is resolved as soon as the presence of the less obvious interpretation is discovered. It is the task of the recipient to figure out how the question or answer makes sense in terms of the original interpretation of the question. To be able to do this and to appreciate it, recipients have to be able to reflect on and manipulate language; recipients have to approach language consciously as an object of thinking, in stead of only as a medium of communication. This appeal to metalinguistic knowledge and abilities make verbal riddles an interesting instrument for the measurement of metalinguistic awareness. Investigating the literature, generally three levels of linguistic ambiguity are distinguished (Kurvers, 1981; 2004):

1. **Lexical ambiguity (or morphological)**
   The humorous ambiguity stems from a double meaning of single lexical item, for example:

   Q: What dog keeps the best time?
   A: A watch dog.

2. **Phonological ambiguity**
   The humorous ambiguity stems from a double meaning of a phonetic sequence, for example:

   Q: Why did the cookie cry?
   A: Because its mother had been a wafer so long.

3. **Syntactic ambiguity**
   The humorous ambiguity stems from a string of words that can be parsed in several ways so that different interpretations are possible, for example:

   Q: How do you keep fish from smelling?
   A: Cut off their noses.

Just like the different joking-techniques from section 2.2.2, different types of ambiguity are assumed to require for different levels of cognitive processing. In this respect, researchers became interested in how children of different ages, and different levels of cognitive and linguistic development, respond to riddles of different metalinguistic complexity.

2.3 Present state of the art

Sections 2.1 and 2.2 dealt with the embedding of metalinguistic awareness into the context of metacognition and introduced the core concepts in this field. Furthermore, it provided an overview of how metacognition and metalinguistics are examined by using humour and riddles, and the underlying rationale of these approaches was discussed. Subsequently, this section deals with the state of the art on research into the comprehension and appreciation of humour and riddles in relation to metacognition and metalinguistic awareness. Investigating literature, it turns out that the literature on this subject is quite dated as most studies were conducted in the sixties and seventies of the 20th century. During the following decades relatively little research has been conducted on this topic. Furthermore, it turns out that the studies are mainly directed at children, and that little research effort has been devoted to (young) adolescents. In spite of that, the studies are considered to be relevant to discuss, since they still offer excellent starting points for further investigation. For clarity's sake, the review is divided into two sections. In section 2.3.1 the focus is on comprehension and appreciation of humour in relation to cognitive development, whereas in section 2.3.2 the focus is rather on comprehension and appreciation of linguistic ambiguities in relation to metalinguistic awareness.

2.3.1 Testing (meta)cognitive development

Zigler et al. (1966) investigated the enjoyment and comprehension of humour in normal children through a series of cartoons shown to 64 children of average intelligence in the 2nd, 3rd, 4th and 5th grades. A strong positive relationship between cognitive maturity (indicated by grade) and comprehension of the cartoons was revealed. They measured an increase of enjoyment in grades 2 through 4, and a significant decrease was found between grades 4 and 5. So, Zigler et al. concluded that the humour stimulus appeals to cognitive processing and that it is an important determinant for the humour response. In other words, children enjoy jokes that are based on principles just beyond their own current intellectual level.

Also, McGhee (1971b, 1971c and 1974) has conducted several studies which established a clear relationship between humour comprehension and the child's stage of intellectual growth. He has, for instance, (1971c) compared cartoons involving logical discrepancies to cartoons involving only perceptual discrepancies. Only children who had achieved the level of concrete operational thinking exhibited comprehension of logically discrepant stimuli. Based on these studies, McGhee (1979) concluded that riddles are understood from the age of 6 or 7 and that they stay popular until the end of primary school. The popularity of riddles culminates according to him between the age of 9 and 11 years.

Prentice & Fathman (1975) examined joking riddles as a developmental index of children's humour. Joking riddles selected for aggressive, dependent, and neutral content were provided to children of

normal intellect in the 1st, 3rd and 5th grades. From grade 1 to grade 5, comprehension of joking riddles increased linearly, while enjoyment decreased modestly. Children's enjoyment of arbitrary non-joking riddles also declined with age, although more sharply. In both instances this decline was attributed to the diminishing appeal of these riddles to older children with more complex cognitive structures. No major relationships between intellectual level and enjoyment of joking riddles and non-joking riddles were revealed, although comprehension of joking riddles was significantly related to intelligence. Enjoyment of joking riddles was not significantly correlated with their comprehension.

2.3.2 Testing metalinguistic development

A study of the development of the ability to detect linguistic ambiguity was conducted by Shultz & Pilon (1973). Children of 6, 9, 12 and 15 years old were presented with a series of sentences, half of which were ambiguous. The results of their study indicated that the ability to detect each of four ambiguity types developed at different ages. Detection of phonological ambiguity appeared first, with the largest improvement occurring between 6 and 9 years old. Next was the detection of lexical ambiguity, which showed a nearly linear increase across the age span from 6 to 15 years. Detection of syntactic ambiguities did not appear until the age of 12.

Shultz & Horibe (1974) tested children of 8, 10 and 12 years old for appreciation and comprehension of jokes, determining development of sensitivity to the structure of verbal jokes by comparing well-structured jokes to jokes with either their incongruity removed or their resolution removed. They found that up to age 9, children were most sensitive to play with the phonological structure. Up to age 12 children were still sensitive for phonological structure and also the lexical jokes stirred imagination. Sensitiveness for syntactic structures did not emerge until age 12.

Fowles & Glanz (1977) asked 14 children from grade 1 to 3 to retell and explain a series of riddles. The riddles contained four types of linguistic ambiguity: lexical, surface structure, deep structure and metalinguistic (in other studies referred to as phonological). They found that the ability to recall riddles was not found to be predictive for the ability to explain them. According to them, three factors determine the level of riddle competence, namely: 1) cognitive development, 2) familiarity with riddles and riddle-telling behaviour in cognitive and social terms, and 3) metalinguistic awareness. In their study, level of competence was not clearly related to age. Fowles & Glanz emphasize the relationship between riddle competence, reading ability and metalinguistic facility.

Yalisove (1978) administered riddles from three categories (conceptual, linguistic ambiguity and absurdness) to 208 children from grade 1 to grade 10 and tested for the predicted sequence of comprehension. Conceptual realistic riddles are assumed to be preferred above linguistic ambiguity riddles, and linguistic ambiguity riddles are assumed to be preferred above absurd riddles (conceptual realistic riddles > linguistic ambiguity riddles > absurd riddles). Comprehension was

measured by the subject's explanation of riddle answers and performance on a multiple-choice task. In addition, the subject's guesses to riddle questions and memory of the riddle answers were recorded. The results showed a general confirmation of the predictions for the classification: conceptual trick riddles were comprehended first (1st to 3rd graders), linguistic ambiguity riddles at an intermediate age (3rd and 6th graders) and absurd riddles were comprehended by the oldest children only (10th grade and college).

Also, Gleitman et al. (1978) investigated the ability of children between 6 and 11 years of age to explain jokes that deal with different types of linguistic ambiguities. These researchers distinguished six types of linguistic ambiguity: phonological, lexical, surface structure, deep structure, morpheme boundaries and morpheme boundaries with phonologic disruption. They concluded that older children performed better than younger ones, and that good readers performed better than poor readers. The ambiguities based on more transparent semantic properties were easier to cope with than the ambiguities that were based on more syntactic principles.

Kurvers (1981) investigated the metalinguistic awareness of 48 children between 8 and 11 years of age in relation to reading proficiency by using riddles. The purpose of this study was to gain insight into the comprehension and appreciation of 48 children of different ages into different types of riddles in relation to reading proficiency. For this, Kurvers distinguished four types of riddles: meaning-form ambiguity, lexical ambiguity, sentence ambiguity (combination of surface and deep structure ambiguity) and non-linguistic ambiguities. Kurvers asked the children to recall, explain and appreciate the riddles. For recall, age, reading proficiency and riddle type seemed to matter. Older children and better readers were better in retelling the riddles and non-linguistic and lexical ambiguous ones were recalled the best. Also for comprehension, age, reading proficiency and riddle type were determining factors. Older children and better readers were better in explaining than younger children and poor readers. Non-linguistic and lexical ambiguous riddles were the easiest to explain. For appreciation, especially riddle type seemed to be of importance. The non-linguistic and lexical ambiguous riddles appealed the most.

Bakker (2003) has conducted a comparable research like Kurvers (1981) but focused on 32 Dutch monolingual and 35 Turkish-Dutch bilingual children between the age of 7 and 11 years old. Bakker found, just like Kurvers, riddle type to be an important determinant for appreciation. As expected, the non-linguistic riddles were better recalled than the linguistic ambiguous ones and she measured an effect of age on riddle comprehension. In this study, the non-linguistic riddles were better comprehended than the linguistic ones and no clear differences were measured between the different linguistic riddle types. Furthermore, Bakker tested the effect of vocabulary on riddle recall and comprehension and concluded that vocabulary is a better explanatory factor than age. For appreciation, the riddle typed seemed to matter. The non-linguistic riddles appealed the most and the meaning-form riddles appealed the least.

2.3.3 Starting points for further investigation

The selection of studies and theory reviewed so far, have shown why metacognitive abilities and metalinguistic awareness are considered being important to investigate in respect to learning and literacy. Humour and particularly riddles are considered being appropriate operationalizations of cognitive and metalinguistic development because of their appeal to the use of metacognitive knowledge and abilities. Therefore, psychologist, educators and linguists have been using them as stimuli in their studies.

From the theories discussed and studies cited it can be concluded that comprehension of riddles and linguistic ambiguities of children increases with age and that this development varies for the type of joke technique or linguistic ambiguity that is involved. This age effect is closely related to cognitive development which increases when children get older, too. Consequently, a turning point in joke and riddle comprehension is observed when children shift from preoperational thinking to concrete operational thinking between the age span of 5 to 8 years. Less is known, however, about the level of riddle comprehension that children show at later ages. What factors are into play at later ages? For younger children, comprehension of different joke techniques and linguistic ambiguities is, anyway, ascribed to the varying cognitive and metalinguistic processing riddles require and children have mastered. Research into the predictors for riddle appreciation, however, provided less consistent results.

As indicated in the introduction, the focus of this study is on the metalinguistic awareness of young adolescents (children between 12 and 16 years of age). However, the focus of the majority of the studies discussed has been on the cognitive and metalinguistic development of children between the age of 6 to 12 rather than on young adolescents. This finding indicates little research effort in both metacognitive as metalinguistic development of (young) adolescents. Reviewing the literature, Curtis (2002), Menyuk & Brisk (2005) and Van Gelderen et al. (2007) conclude that the amount of studies on adolescent literacy, including metalinguistic awareness, is extremely scarce compared to the multitude of studies into earlier literacy development, especially reading. Moreover, are the conducted studies largely concerned with analyses of written language rather than spoken language (Menyuk & Brisk, 2005). Yet, this scarce scientific interest in adolescent literacy is undeserved considering the reports on the arrears in literacy development of large groups of adolescents (Elley, 1992; OECD, 2001; Dagevos et al., 2003; Hacquebord, 2004; Educational Quality and Accountability Office, 2005). Therefore, it is necessary to find out how subskills underlying literacy, such as metalinguistic awareness, develop during adolescence.

Reviewing the scarcely published literature on adolescent literacy, researchers assume that linguistic and cognitive development continues during adolescence (Curtis, 2002 and Van Gelderen et al., 2007). Particularly, children who lag behind need to do some catching up during this period (Menyuk

& Brisk, 2005). Curtis (2002) and Menyuk & Brisk (2005) discuss language development in adolescence, and from these contributions it may be concluded that adolescents still develop lexically. The acquisition of new words and knowledge about words continues, thus adolescents' vocabulary grows in terms of length and abstractness. Also, knowledge of figurative language is considered to develop during adolescence. Acquisition of the ability to comprehend and produce figures of speech is assumed to become more evident during this period. Comprehension of similes and metaphors involves knowledge of word meanings, understanding of physical experiences and familiarity with world and literacy experiences. Menyuk & Brisk relate this skill to the ability to carry out formal operations and also point to Piaget who thinks that these abilities develop during adolescence and beyond. Furthermore, it is thought that adolescents develop their knowledge of sentence and discourses processing during adolescence, since it is proved that complex sentence structures are better understood by young adults than by older children (Kramer et al., 1972). Another aspect of language that appears to take some time to acquire is in the area of morpho-phonology. A number of studies have indicated that most children acquire knowledge of how to derive new meanings of words by adding certain endings to words. It is not until the high school years that awareness of the meaning of such relations is acquired (Curtis, 2002; Menyuk & Brisk, 2005).

Considering the expectations for the development of metacognitive and other linguistic abilities and the theories and studies on child metalinguistic awareness, it may be expected that metalinguistic development continues during adolescence. In this respect, it is questionable whether this growth is linear and comparable for students of different grades, school tracks and varying linguistic competences. According to Segalowitz & Hulstijn (2005) every knowledge type is subject to fluctuations over time and so is the fluency with which the skills can be executed. Van Gelderen et al. (submitted) and Schoonen et al. (in preparation) found in the PROO[3] field-of-interest study, entitled '*Transfer of higher-order processes and skills in reading and writing in Dutch and English*', fluctuations in the composition of reading and writing subskills in the first three years of secondary school among a group of over 200 students, sampled from all school tracks. For instance, for some subskills no increase was found from the first till the second year, whereas a significant increase was found from the second till the third year. Performance on other skills increased from the first to the second year but did not increase in the third year; performance on some subskills even decreased slightly in one of the two intervals. These findings clearly show that the patterns of student's literacy-related skills is subject to developmental change, a pattern that thus cannot be described in terms of simple linear growth. According to Van Gelderen et al. (2007) it might be that for poorly performing students, phenomena of non-linear growth will be more typical than for a high performing population of pre-academic students, where one might expect a rather steady increase in knowledge and skills.

[3] PROO refers to Programmaraad voor het Onderwijsonderzoek. This Dutch research council is concerned with the formulation of research programmes in the field of education.

Consequently, it is questionable if these predictions are consistent with reality and which factors explain expected differences in adolescents' metalinguistic and literacy development. What effects do grade and school tracks have and what are the effects of varying linguistic competences in this respect? In conclusion, still a lot remains to unravel on the metalinguistic and literacy development in adolescence. Therefore, this study is an attempt to contribute to our understanding of metalinguistic awareness in early adolescence and thereby to our understanding of adolescent literacy development.

2.3.4 Hypotheses

To investigate the metalinguistic awareness of young adolescents several hypotheses are tested. In this section, these hypotheses and their rationale are presented.

As several studies (Gleitman et al., 1978; Yalisove, 1978; Kurvers, 1981; Bakker 2003) found that non-linguistic (conceptual) and lexical riddles are comprehended from younger ages and better comprehended than riddles dealing with more complex metalinguistic activities such as meaning-form and sentence ambiguities, and studies of Shultz & Pilon (1973) and Shultz & Horibe (1974) even observed that the sensitiveness to syntactic ambiguities emerged from the age of 12, it is hypothesized that in this study:

> *Hypothesis 1:* Also for young adolescents, riddle comprehension is related to the metalinguistic complexity of the riddle categories; riddles belonging to the conceptual and the lexical ambiguity categories are better comprehended than riddles belonging to the meaning-form ambiguity and sentence ambiguity categories.

Because several studies (Curtis, 2002; Van Gelderen et al., 2007) assume that linguistic and cognitive development continues during adolescence, it is hypothesized that in this study:

> *Hypothesis 2*: Riddle comprehension is related to grade. Young adolescents attending 9th grade will show better riddle comprehension compared to young adolescents attending 7th grade.

As Van Gelderen et al. (2007) indicate that linguistic competences and their development may not be similar for students from different school tracks, it is hypothesized in this study:

> *Hypothesis 3a:* Riddle comprehension is related to school track. Young adolescents attending the pre-academic school track will show better riddle comprehension than young adolescents attending the vocational school track.

Hypothesis 3b: Young adolescents attending the vocational school track will show a different pattern of comprehension improvement than young adolescents attending the pre-academic school track.

Perfetti (1999) and Van Gelderen et al. (2003) suggest that literacy skills build on language skills, metacognitive knowledge and metalinguistic awareness to a great extent. Thereby, metalinguistic awareness is assumed to be related to linguistic competences. Therefore, it is hypothesized that in this study:

Hypothesis 4: Riddle comprehension is related to linguistic competence. Young adolescents with better linguistic competences will show better riddle comprehension than young adolescents with weaker linguistic competences.

Because reading skills and world knowledge are intuitively related to the comprehension and appreciation of jokes and (verbal) riddles, it is hypothesized that in this study:

Hypothesis 5a: Young adolescents who read frequently will show better riddle comprehension than young adolescents who read occasionally.

Hypothesis 5b: Young adolescents who follow the news will show better riddle comprehension than young adolescents who hardly follow the news.

Hypothesis 5c: Young adolescents who follow the news will appreciate the riddles more than young adolescents who hardly follow the news.

Zigler et al. (1966) and McGhee (1971) argue that what one finds amusing is dependent on one's intellectual growth and that jokes as such should be based on principles that are just beyond people's current intellectual level. Embracing this reasoning, riddle appreciation might be a good indicator for current levels of intelligence and metalinguistic awareness. Furthermore, the reasoning predicts that riddles lose on popularity when children get older and attend higher levels of education, as it is expected that children then overgrow this type of humour as a result of intellectual and metalinguistic growth. Therefore, it is hypothesized that in this study:

Hypothesis 6a: Riddle appreciation is related to the metalinguistic complexity of the riddle categories. Riddles requiring more metalinguistic activity such as the sentence ambiguity and meaning-form ambiguity riddles will be differently appreciated than riddles requiring less or no metalinguistic activity such as the lexical ambiguity and conceptual riddles.

Hypothesis 6b: Riddle appreciation is related to grade. Young adolescents attending 7th grade will appreciate the riddles more compared to young adolescents attending 9th grade, because 7th graders are expected to be more challenged by the riddles than the 9th graders.

Hypothesis 6c: Riddle appreciation is related to school track. Young adolescents attending the vocational school track will appreciate the riddles more compared to young adolescents attending the pre-academic school track, because vocational students are expected to be more challenged by the riddles than the pre-academic students.

Hypothesis 6d: Riddle appreciation is related to riddle comprehension. Young adolescents who show better riddle comprehension appreciate the riddles more compared to young adolescents who show poorer riddle comprehension.

3 Design of the study

After exploring the theoretical and empirical background of the study in Chapter 2, this chapter deals with the design of the actual study. First, the young adolescents that participated in the study are introduced. To test the hypotheses a Riddle test and a Reading Vocabulary Test have been developed and examined. The Riddle test is used as a measure of metalinguistic awareness and the Reading Vocabulary as a measure of linguistic competence. In this chapter these tests and the questionnaire are discussed, followed by a description of the experimental procedure. Finally, the scoring systems are described as well as the statistical approach.

3.1 Participants

The study was conducted among a sample of 91 Dutch young adolescents. 83 Participants indicated Dutch as their mother tongue whereas 8 participants indicated another mother tongue than Dutch. The young adolescents were 7th and 9th graders attending vocational secondary education (*vmbo-basisberoepsgericht* and *vmbo-kaderberoepsgericht*) or pre-academic education *(vwo)* and were drawn from three different public schools located in the provinces Zeeland and Noord-Brabant, The Netherlands. All three schools had a mixed population of students from lower-, middle and high-class families. For the 7th grade, ages ranged from 12 to 15 (M=12.9, SD=.53) and for 9th grade ages ranged from 14 to 16 (M=14.8, SD=.48). For the selection of the participants only the criteria of grade and school track are used. Because of organizational preferences of the participating schools several classes have participated completely. As such the sample was not a random sample of the student population from the participating schools. Table 3.1 provides an overview of the sample according to grade, school track and gender.

Table 3.1 Distribution of the sample to grade, school track and gender

	Vocational			Pre-academic			Total		
	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
Grade 7	13	10	23	12	10	22	25	20	45
Grade 9	3	20	23	11	12	23	14	32	46
Total	16	30	46	23	22	45	39	52	91

Table 3.1 shows that in general, the participants are equally distributed on grade and school track; both 45 versus 46 participants (χ^2(1, n=91)=.01, p=.92). When subdividing the participant categories grade and school track according to gender, the distribution becomes rather unequal as a significant difference was measured for grade (χ^2(1, n=91)=5.86, p<.025), while no significant difference was measured for school track (χ^2(1, n=91)=2.48, p=.12). The unequal distribution of gender for grade is caused by the vocational 9th graders as vocational students start attending courses in the field of their interest from this grade. The participating vocational 9th graders attended

courses into the field of 'Nursing and Welfare' which resulted in an overrepresentation of girls in 9th grade. Under the circumstances and time span in which the study was conducted, it was difficult to prevent this problem as the distribution of boys and girls was unequal for other potential participating classes too. The other potential classes contained students solely interested in the domains of 'Engineering', 'Construction' or 'Nature' and would have resulted in an overrepresentation of boys. As gender is not assumed to be the most crucial factor for the ability to comprehend and explain riddles, it is decided to consider the sample as normally distributed. Obviously, this fact should be taken into account interpreting the data. To maintain the reliability and usefulness of the data analyses no special attention has been given to gender differences in the remaining analyses.

3.2 Stimuli

3.2.1 Riddle test

Following studies of Fowles & Glanz (1976), Kurvers (1981; 2004) and Bakker (2003), riddles are used as operationalization of metalinguistic skills in this study. To measure the appreciation and comprehension of riddles a so-called Riddle test has been developed and examined. The Riddle test was developed with the ambition to construct a test appealing to young adolescents and to make use of authentic jokes. To ensure this, humoristic youth-websites on the Internet were searched for appropriate riddles and cartoons. Although particularly verbal riddles are appropriate for testing metalinguistic awareness, also conceptual riddles, riddles on knowledge about the world or logic, were included in the Riddle test. This has been decided in view of the ambition to develop an appealing test and previous studies of Bakker (2003) and Kurvers (1981; 2004) showed that linguistic riddles compared to conceptual riddles were less appreciated. Furthermore, the conceptual riddles could serve as a distracting mechanism in view of the focus on the linguistic riddles.

The demands of the linguistic riddles were distinct: the process of 'getting' the riddle necessitates dealing with linguistic ambiguity on different levels (word, phrase, and sentence) and often a substantial shift in levels (from concrete to abstract or from literal to metaphorical) is required within the framework of the single riddle. Furthermore, the themes of the riddles and the cartoons had to be appealing to youngsters and the vocabulary had to be comprehensible. From the hundreds of riddles and cartoons studied, 45 items were selected according to selection criteria for the categories modified from Schultz & Horibe (1974), Kurvers (1981) and Bakker (2003).

The categories to which the riddles have been classified are:

A. Meaning-form ambiguity

The answer of the meaning-form ambiguity riddles can be explained by shifting the attention from meaning to form. Often, a sublexical analysis is needed, for example:

Q: What heeft Shakira voor en hebben de Pussy Cat Dolls van achter?
A: De S.

English equivalent of a riddle dealing with a meaning-form ambiguity:

Q: What is the end of everything?
A: The G.

B. Lexical ambiguity

The answer of the lexical ambiguity riddles can be explained by shifting the attention from one meaning to the other on word-level or constituent-level, for example:

Q: Waarom hebben ze in België ondergrondse scholen?
A: Omdat ze daar dieper kunnen nadenken.

English equivalent of a riddle dealing with a lexical ambiguity:

Q: What has four wheels and flies?
A: A garbage truck.

C. Sentence ambiguity

The answer of the sentence ambiguity riddles can be explained by shifting the attention from one meaning to the other on the level of the sentence, for example:

Q: Hoe voorkom je dat bejaarden gaan ruiken?
A: Door hun neus eraf te snijden.

English equivalent of a riddle dealing with a sentence ambiguity:

Q: How do you keep fish from smelling?
A: Cut off their noses.

D. Conceptual

The answer of the conceptual riddles cannot be explained by some form of linguistic ambiguity, but by knowledge about the world or logic, for example:

Q: Wat is de overeenkomst tussen Feyenoord en Sinterklaas?
A: Ze zijn allebei rood met wit en niemand gelooft er meer in.

English equivalent of a conceptual riddle:

Q: How can you put six elephants into a VW?
A: Three in the front and three in the back.

Based on the experiences in a small pre-pilot study with eight vocational students, 22 items were selected for the actual test. Riddles containing too difficult words, or dealing with theme's that turned out to be unfamiliar with young adolescents were not selected. The next two riddles were, for instance, not selected:

Q: Welke tent krijg je niet opgezet?
A: De impotent.

or

Q: Wat is een leren string?
A: Een Holleeder.

The first riddle plays with impotence, and this turned out to be a theme which was unknown to the majority of the young adolescents in the pre-pilot study. The same was true for the word and name 'Holleeder' in the second riddle. As the majority of the young adolescents were not familiar with these words, they were not able to resolve the double meanings and to comprehend the riddle. This demonstration of incomprehension may, however, not be caused because young adolescents were not able to deal with double meanings. Therefore, these kind of doubtful riddles were not selected for the actual Riddle test.

Two items functioned as warm-up items to acquaint each participant with the test procedure; the other 20 items were used for the actual testing. The linguistic categories (A to C) were represented by four items each, the conceptual category (D) by eight items, of which four cartoons. To ensure the attractiveness and authenticity of riddles belonging to the oral culture, and to guarantee that all items were presented the same way to all participants, a family member of the experiment recorded the riddles. This way, the riddles in written form were transformed into audio files. The audio files and the cartoons were presented in a digital presentation on the computer. After each test item, a slide with an adapted version of the so-called 'Smileyometer' was included with which the participants were able to quantify their appreciation of the riddles and the cartoons by giving a mark from 1 (very bad) to 5 (very good) depending on how good the participant thought each riddle or cartoon was (see Figure 3.1). The original Smileyometer is a 5-point Likert scale using facial

representations of the items with the mouth changing from a sad face to a smiling one. Facial representations of scales are fairly standard for testing children and are used, for instance, by Krahmer and Swerts (2005) in their Feeling of Knowing studies. In addition, they have also been used for the usability of educational software (e.g., Read et al., 2000) and to study children's perception of irony (Harris & Pexman, 2003).

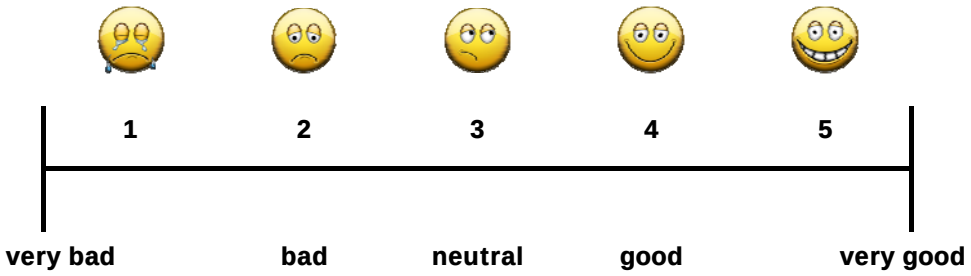

Figure 3.1 The Smileyometer used

The sequence of the test items in the Riddle test was pseudo-random, as it was prevented that two items from the same riddle category succeeded and that an order of riddle category was created. Two versions of the Riddle test were created. The versions contained the same items but were ordered differently; one counterbalancing the other to minimize order effects. The reliability of both versions of the Riddle test is good (both Cronbach's α=0.83, n_{items}=20). See Appendix 1a and 1b for a complete overview of the riddles, cartoons and their presentation sequence. Appendix 1c provides several screenshots of the digital Riddle test.

3.2.2 Reading Vocabulary test

To measure the reading vocabulary the so-called Reading Vocabulary test has been administered. The Reading Vocabulary test was a shortened version of the original curriculum independent vocabulary test used by Hootsen & Van der Werf (2006). The test of Hootsen & Van der Werf, which was in turn based on Hazenberg (1994), contained 90 test items and was originally developed for testing Dutch vocabulary knowledge of high educated adult second language learners. Because of time and cognitive load limitations, the number of test items was reduced from 90 to 50 test items. Therefore, the 52 most reliable items (Test item α<.945) were selected. Two test items functioned as warm-up items; the other 50 items formed the actual test.

The Reading Vocabulary test was presented in multiple-choice form. The target words were presented in a context sentence from which the meaning of the target word was not inferable. The target word was underlined. A choice of four answers of comparable length was presented in alphabetical order; the participant's task was to circle the answer that meant exactly the same as the underlined word(s). The answers were formulated in the 2.000 most frequent lemmas of the Dutch language to ensure comprehension for all participants. An example of a test-item:

Mag ik jouw kam even lenen?
(Can I borrow your comb?)

A. ding waarmee je het eten snijdt
   (a thing with which one can cut food)

B. ding waarmee je je haren netjes maakt
   (a thing with which one can do one's hair)

C. ding waarmee je rekent
   (a thing with which one can calculate)

D. ding waarmee je schrijft
   (a thing with which one can write)

The score on the test is determined by counting up the correct answers. The maximum score to be obtained was 50. The score on the test provided an indication of the reading vocabulary of the participant and is used as a measure to compare the participants within the sample. The reliability of this test is good (Cronbach's α=0.82, n_{items}=50). Appendix 2 contains the complete Reading Vocabulary Test used.

3.2.3 Questionnaire

To gain more insight into the profile of the participants in the sample, a short questionnaire has been developed. From this questionnaire information about participants' age, gender, educational level, grade, country of birth and mother tongue was obtained. Next to that, the questionnaire contained four questions about reading behaviour and world knowledge, since these factors might be predictive for riddle appreciation and comprehension too. To test whether young adolescents follow the news and are aware of what is happening in the world; participants were questioned about their frequency of reading the newspaper and watching the newscast. Participants could indicate on a 5-point Likert scale how often they read in general, how often they read the newspaper (in paper or on the internet) and how often they watch the newscast (never, rarely, occasionally, frequently and very frequently). The last question on reading behaviour was concerned with young adolescent's favourite readings. They could choose between books, magazines, comics and newspapers. In Appendix 3 one can find the complete questionnaire.

3.3 Experimental Procedure

Each participant was tested individually in an unoccupied classroom during the school day. All participants completed the same three-step procedure in one session. First, the Riddle test was administered. The experimenter gave the following instructions: *"I am trying to find out what kind of jokes youngsters like. Therefore, I want to let you hear and show some jokes and thereafter you tell*

me if you think it was a good joke or a bad one and why."[4] The intended experimental procedure was: guessing, appreciating and explaining. However, after the first examinations it appeared that participants immediately started to explain after hearing the riddle solution. It was decided to not interrupt the explanations because the explanation process actually helped participants in their riddle comprehension. This way, participants were eventually better able to quantify their level of appreciation. As such, the experimental procedure was changed to: guessing, explaining and appreciating. In case of the riddles, the participant heard the question and after four seconds the answer was given. Within those four seconds, the participant was allowed to guess for the answer. In the meantime, the guesses indicated whether the participant was already acquainted with the riddle or not. To unravel the degree of riddle comprehension, the participant was asked to explain what was supposed to be funny in each joke. This way, it was tested whether the participant understood the trick to get the joke and if he or she was able to put that into words. Depending on the participant's responses, the experimenter posed more questions to clarify what the participant exactly meant. The following conversation with Robin (7th grade, vocational) on riddle 5[5] exemplifies this kind of questioning:

> *"(What do you think is funny? Why do you start laughing?) Because he says that the Belgians can think deeper, if they go underground. (And do you think that they are able to think deeper there?) No. (Imagine the answer to the question why do they have underground schools in Belgium, would be: because they can think better over there. Do you think that the joke would be just as good or would the joke become better or worse?) I think worse. (Why do you think that?) Because I think that the joke is not correct anymore. (And why do you think that?) Because first he talks about undergrounds and when he talks about deeper, it is actually meant thinking better instead of only deeper. (Yes, you are right!)."*

When the participant indicated that particular words were unknown, the experimenter explained them and figured out whether the participant was still able to explain the joke. The conversation with Cherie (9th grade, vocational) on riddle 11 passed for example as follows:

> *"What are 'ghetto blasters'? (Ghetto blasters are big portable radios. So, can Surinamese people shout louder than radios?) No, of course they can't. I do get this joke!"*

Appendix 5 contains two records of the Riddle test examination which provides a good idea of the riddle explanation examination.

[4] To control for hints towards the format of the jokes, the Riddle test was presented as a Humor Test to the participants. Therefore, the experimenter talked about jokes instead of riddles. For clarity's sake the concept riddle will be used in this reporting.

[5] For clarity's sake, the riddles that are used for exemplifying are numbered. The numbers correspond to the numbers of the riddles in Appendix 1a.

Next, the participant was instructed to give a mark, like it was a report mark, from 1 (very bad) to 5 (very good) depending on how good the participant thought each riddle or cartoon was. So, the participant's rating of appreciation was quantified. The experimenter scored the marks for appreciation immediately on a special score form (See Appendix 4). The Riddle test started with instructions about the functioning of the Smilieyometer and presented two warm-up riddles to acquaint the participant with the task and the stimuli. After that, the routine was repeated for the 20 jokes belonging to the actual test. The participant's responses were recorded with a digital voice recorder. Examination of the Riddle test lasted on average 14.7 (*SD*=3.93) minutes.

After that, the Reading Vocabulary Test was examined. The participant was asked for 50 test items to circle the correct meaning of out of four answer options. Examination of the Reading Vocabulary Test lasted on average 11.7 (*SD*=2.69) minutes. Finally, the participant was asked to complete a short questionnaire which questions about relevant background data and question about participants' reading behaviour and interests in actuality. After completing the questionnaire and a short informal talk, the participant was dismissed.

3.4 Scoring

The participants' responses to the Riddle test were recorded and afterwards analysed and scored by the experimenter. To control for the objectivity of the analysis, transcripts of 20 participants were scored by two evaluators. The overall inter-evaluator agreement was good: 84% (kappa=.84). The cases of disagreement were discussed and this way agreement was achieved for the ambiguous responses. The Riddle test tested two aspects of the riddles: comprehension and appreciation. For these two aspects, specific scoring systems were developed and applied. After the attachment of the scores to the single test items, the scores were transformed into one score per category. Since the cartoons served only as an instrument for distraction, the cartoons were not included in the analysis. As such, the number of items for the analyses for the conceptual category is equal to that of each of the linguistic riddle categories: every category is represented by four items.

3.4.1 Comprehension

To determine to what extent the participants comprehended the riddles, they were asked to explain the riddles to the experimenter. As such, the participants' explanations were used as a measure for their level of comprehension. Two aspects of the participants' explanations were analysed. First, it was examined whether the participant had understood the riddle fully and was able to demonstrate that by giving a complete riddle explanation. After analysis scores for the extent of comprehension were assigned to all single riddles. Following, it was analysed which type of knowledge participants used to explain the riddles: knowledge of the world, or also knowledge of the functioning and characteristics of language. This way, the so-called 'orientation of the explanation' was determined

and orientation labels were assigned. By comparing the explanation orientations for grade and school track, insights were obtained on which knowledge is most available for which type of students: only knowledge about the world or also knowledge about the functioning and characteristics of language. This knowledge was expected to help understanding why some young adolescents were able to give complete riddle explanations and why other young adolescents were not able to do that. Furthermore, this additional analysis may contribute to the discussion on whether one first has to gather knowledge on structural characteristics of language before this knowledge can be used for metalinguistic tasks (among others Gombert, 1992). Or, such as Bialystok (1981) suggest, that the ability to reflect on language is independent of the knowledge people have on language. The riddle explanations of both Riddle test versions were scored as follows:

Riddle comprehension

0 =No or wrong comprehension

The content of the participant's explanation was wrong or the participant indicated that he or she did not comprehend the riddle. For example:

Linda (7th grade, vocational) responded to riddle 5 as follows: *"I do not understand that joke."* And Ilona (9th grade, vocational) who responded to riddle 2: *"(What could the S be about?) Perhaps about their breasts and their bottom?"*

1 = Partial comprehension

The explanation of the participant was partly correct, but missed some essential elements by which the (linguistic) trick was not explained completely and thus not understand fully. In these cases, participants often focused on only one meaning of the ambiguous word, phrase or sentence or were not aware of the linguistic trick that was involved. For example:

Wendy (7th grade, vocational) who explained riddle 1 as follows: *"Ramadan refers to the period when they do not eat and drink from the morning to the evening. (And why is Ramadan written on the bumper car?) P: I have no idea."*

And Stefan (7th grade, vocational) who explained riddle 10 as follows: *"Because the weekend is over, the Belgian is walking with his bike to his work (Okay, but why is he walking and not sitting on his bike?) Because he is a stupid Belgian. (Is there still another reason, or only because he is a stupid Belgian?) Only, because he is stupid."*

2 = Full comprehension

The explanation of the participant contained all aspects or anyway the least obvious aspect of the (linguistic) trick of the riddle which indicated that the riddle was fully comprehended.

A good example of a participant explaining all aspects is Maarten (7th grade, pre-academic) who explained riddle 8 as follows: "*The picture has to be developed to get a print. Here, one jokes with the fact that Belgians are seen as stupid and then they mean that the Belgians are not developed in terms of intelligence".*

The response of Rachiel (9th grade, vocational) to riddle 16 exemplifies a response in which not all aspects of the trick are explicitly explained, but is nevertheless scored as 2 because the least obvious aspect of the riddle was explained: *"No, a penalty is not always scored"*.

Explanation orientation

0 = No or unclear orientation

From the participant's explanation it is unclear which knowledge (language or world knowledge) the participant used to explain the riddle, or the participant's explanation indicated that the riddle was not comprehended at all. For example:

Tim (7th grade, vocational) who responded to riddle 6 as follows: *"Getikt? Why getikt? (What does getikt mean?) Uhmm, I have no idea."*

1 = World-oriented

From the participant's explanation it is inferable that the participant used its knowledge of the world to explain the riddle. For example:

Nandi (9th grade, vocational) who responded to riddle 5 as follows: *"They do not have underground schools over there, have they? This is ridiculous."* And responded to riddle 9 as follows: *"I do not get it. Weekends are fun, aren't they? Does she not want to have a weekend off then?"*

2 = Language-oriented

From the participant's explanation it was inferable that the participant used knowledge of the functioning and also its knowledge on the functioning and characteristics of language to explain the riddle. For example:

Thom (9th grade, vocational) who responded to riddle 4 as follows: *"Are the letters of the word turned back?"*

And Ashley (7th grade, vocational) who responded to riddle 1 as follows: *"Ramadan has something to do with a religion and if you say "Ram-me-dan (hit me) than you have to bump. "Ram-me-dan" are then three individual words."*

Appendix 6 lists an overview of various responses and corresponding scores that provides a good idea of the analysis and the functioning of the scoring systems.

3.4.2 Appreciation

Following Kurvers (2002) and Bakker (2003), the participants were asked to quantify their ratings of appreciation by giving a mark from 1 to 5 depending on how good the participant thought each joke was. The marks 1 to 5 corresponded to:

1 = very bad
2 = bad
3 = neutral (not good, not bad)
4 = good
5 = very good

As the participants were instructed to give a mark responding to 1=very bad, 2=bad, 3=neutral, 4=good and 5=very good, the numbers 1 to 5 are viewed as numbers on the ratio scale instead of on the ordinal scale. Consequently, for the benefit of the statistical analyses appreciation mean scores for the four separate riddle categories are computed so that the riddle categories can easily be compared.

3.5 Statistical approach

Response parameters were analysed using ANOVA (Analysis of Variance) with SPSS 15.0 according to the following statistical model:

$$Y_{ijk} = \mu + Riddle_i + School\ track_j + Grade_k + RxS_{ij} + RxG_{ik} + SxG_{jk} + RxSxG_{ijk} + Error_{ijk}$$

Where:	Y	= Response parameter
	μ	= General mean
	Riddle	= Effect of riddle type (i = 1…4)
	School track	= Effect of school track (j = 1, 2)
	Grade	= Effect of grade (k = 1, 2)
	Interaction RxG	= Interaction between effect of riddle type and grade
	Interaction RxS	= Interaction between effect of riddle type and school track
	Interaction GxS	= Interaction between effect of grade and school track
	Interaction RxSxG	= Interaction between effect of riddle type, grade and school track
	Error	= Error term

In case the three-way interaction term was insignificant then it was deleted from the model and a next run of SPSS was conducted with the simplified model. This was repeated until the simplest model could be obtained. For each response parameter the *p*-value of the model and the effect size was calculated (η^2). Effects with $p \leq .05$ were considered as statistically significant.

4 Results

In chapter 4, the results of the study are reported and discussed in view of the hypotheses stated in section 2.3.4. In sections 4.1 and 4.2 first the data on linguistic competence, reading behaviour and world knowledge are discussed as they are used in the subsequent analyses. Following in section 4.3 young adolescents' riddle comprehension is analysed in terms of completeness and on the type of knowledge that young adolescents used for riddle explanation. Finally, in section 4.4 young adolescents riddle appreciation is discussed. In each case, the presentation of data starts with an overview of the scores as a function of grade and school track, followed by general analyses which become more specific at the end of every section. When scores between grade and school track differ substantially, the scores are illustrated with histograms.

4.1 Linguistic competence

4.1.1 The Reading Vocabulary test

To determine the linguistic competences of the young adolescents in the sample, the Reading Vocabulary test was administered. In Table 4.1, the scores on the Reading Vocabulary test are presented as a function of grade and school track.

Table 4.1 Scores on the Reading Vocabulary test and standard deviation between brackets as a function of grade, school track and the overall sample

	Vocational (n=46)	Pre-academic (n=45)	Overall sample (n=91)
Grade 7 (n=45)	34.87 (5.11)	41.14 (3.51)	38.00 (5.38)
Grade 9 (n=46)	36.48 (4.56)	44.17 (3.32)	40.33 (5.54)
Overall sample (n=91)	35.67 (4.85)	42.66 (3.71)	39.17 (5.57)

First, it was investigated whether students from different grades and school tracks differ in their reading vocabulary by using a 2 x 2 ANOVA with Reading Vocabulary test score as dependent variable, and grade and school track as between-subjects factors. No significant interaction was found between grade, school track and the score on the Reading Vocabulary Test ($F<1$). However, significant main effects for grade ($F_{(1,90)}=6.96$, $p<.01$, $\eta^2_{partial}=.07$) and school track were obtained ($F_{(1,90)}=62.85$, $p<.001$, $\eta^2_{partial}=.42$). These findings indicate that 9th graders know significantly more words compared to 7th graders ($M=40.3$ versus $M=38.0$) and that pre-academic students know significantly more words than vocational students ($M=42.7$ versus $M=35.7$). A post-hoc analysis revealed that pre-academic first graders know significantly more words than vocational third graders ($F_{(3,90)}=23.68$, $p<.001$, $\eta^2=.45$). More specific ANOVA's showed that for both 7th and 9th grade, the pre-academic students know significantly more words compared to the vocational students ($F_{(1,44)}=22.79$, $p<.001$, $\eta^2=.35$ and $F_{(1,45)}=42.75$, $p<.001$, $\eta^2=.97$, respectively). Notice the large

effect sizes, in this respect. Furthermore, the ANOVA's revealed that vocational 9th graders know as much words as their peer-students in 7th grade ($F_{(1,45)}$=1.27, p=.27, η^2=.03), whereas pre-academic 9th graders show a significant vocabulary growth compared to their peer-students in 9th grade ($F_{(1,44)}$=8.89, p<.005, η^2=.17). The vocabulary growth for vocational and pre-academic students was 1.61 and 3.03, respectively. These findings are rather alarming, since they indicate a stagnation of vocabulary growth for vocational students. In general, young adolescents seem to expand their vocabularies during early adolescence, but when it is distinguished between school track the findings indicate that this is unfortunately not true for all school tracks. As such, the findings confirm the assumption of Van Gelderen et al. (2007) that language skills may not develop similarly for students attending different school tracks. Additionally, the findings indicate that the assumption of Curtis (2002) and Menyuk & Brisk (2005) that vocabularies grow in early adolescence has to be nuanced. By way of illustration, the results are visualised in Figure 4.1.

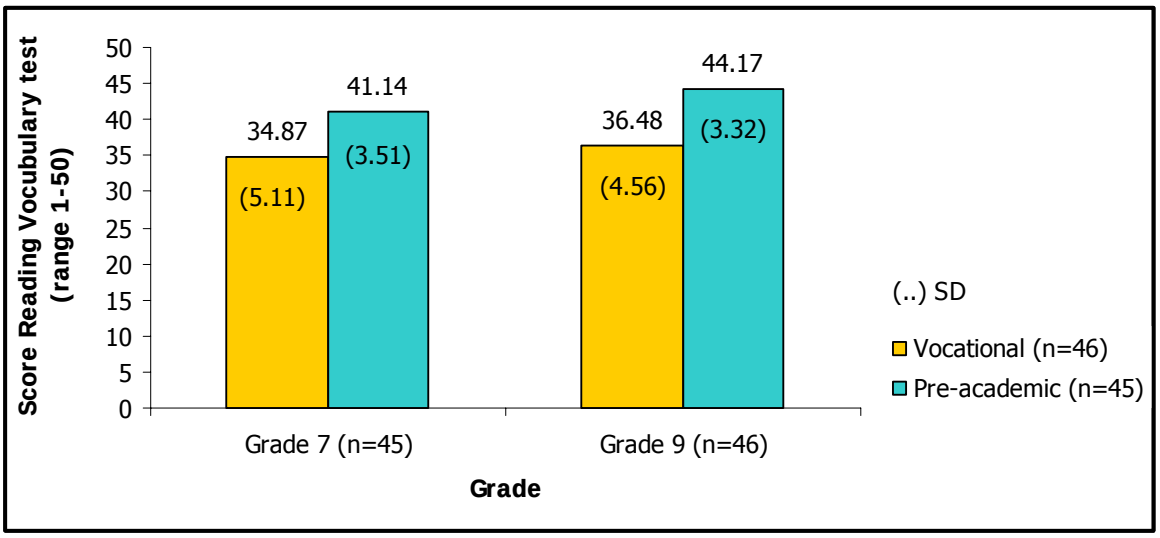

Figure 4.1 Score on Reading Vocabulary test as a function of grade and school track

4.1.2 Score for language on Cito Eindtoets

Next to the score on the Reading Vocabulary test, the percentile scores on the component *Taal* (language) on the *Cito Eindtoets* were collected and used as a measure for linguistic competence. The *Cito Eindtoets* is conducted at the final grade of Dutch primary education to provide insight in students' competences in the domains of language, mathematics, world orientation and learning strategies. The language component consists of 100 multiple choice questions on: cloze testing[6] (n_{items}=30), spelling (n_{items}=20), reading comprehension (n_{items}=20) and vocabulary (n_{items}=30). The *Cito Eindtoets* is an instrument that partly determines the school choice for secondary education and

[6] A cloze test is an exercise, test, or assessment consisting of a portion of text with certain words removed. The participant is asked to replace the missing words. Cloze tests require the ability to understand context and vocabulary in order to identify the correct words or type of words that belong in the deleted passages of a text.

as such the scores on the test components are expected to differ significantly for school track. No significant differences were expected for grade, since the scores are obtained for all students in the same period of the final grade of primary education. Table 4.2 presents the scores for language on the *Cito Eindtoets*.

Table 4.2 Score for language on Cito Eindtoets and standard deviation between brackets as a function of grade, school track and the overall sample

	Vocational (n=46)	Pre-academic (n=45)	Overall sample (n=91)
Grade 7 (n=45)	17.48 (12.08)	79.23 (14.20)	47.67 (33.82)
Grade 9 (n=46)	24.52 (13.19)	85.91 (12.99)	55.22 (33.63)
Overall sample (n=91)	21.00 (13.00)	82.64 (13.86)	51.48 (33.75)

First, it was investigated whether students from different grades and school tracks differ in the score for language on the *Cito Eindtoets*. A 2 x 2 ANOVA with the score for language on the *Cito Eindtoets* as dependent variable, and grade and school track as between-subjects factors yielded no significant interaction between grade, school track and the score for language on the *Cito Eindtoets* ($F<1$). As expected, a very strong significant main effect was found for school track ($F_{(1,90)}=500.38$, $p<.001$, $\eta^2_{partial}=.85$), which means that the pre-academic students had indeed much better linguistic competences at the end of primary education compared to the vocational students ($M=21.0$ and $M=82.6$, respectively). In Figure 4.2 the results are visualized.

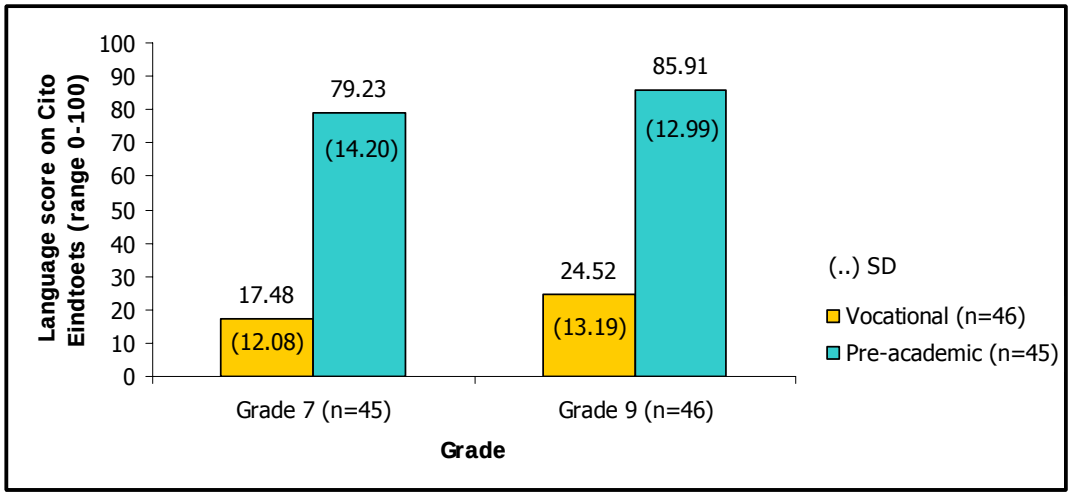

Figure 4.2 Score for language on Cito Eindtoets as a function of grade and school track

More specific ANOVA's showed that for both 7th and 9th grade, the pre-academic students showed significantly better linguistic competences at the end of primary education than the vocational students ($F_{(1,44)}=247.61$, $p<.001$, $\eta^2=.85$ and $F_{(1,45)}=252.81$, $p<.001$, $\eta^2=.85$, respectively). Notice the very large effect sizes, in this respect. Contrary to the expectations, also a significant main effect, although less strong than for school track, was found for grade ($F_{(1,90)}=6.22$, $p<.025$,

$\eta^2_{partial}$=.07). This finding indicates that the 9th graders in the sample had significantly better linguistic competences at the end of primary education compared to the 7th graders in the sample. However, the difference in score may be also due to the relatively easier test when the 9th graders were tested. This finding is not problematic for the design as specific ANOVA's revealed that vocational and pre-academic 9th graders had no better linguistic competences at the end of primary education compared to vocational and pre-academic 7th graders.

Finally, the correlations between the scores on the Reading Vocabulary test and the percentile for language on the *Cito Eindtoets* were calculated. For the overall sample, a positive and significant correlation was found (Pearson r=.71, p<.001). Based on the preceding finding, the percentile score for language on the *Cito Eindtoets,* is next to the score on the Reading Vocabulary test, considered as a reliable measure to compare the young adolescents within the sample.

4.2 Reading behaviour and world knowledge

4.2.1 Reading behaviour

To get insight in the reading behaviour of the young adolescents in the sample, they were asked to indicate how often they read. In Table 4.3, the results on young adolescents' reading frequencies are presented as a function of the overall sample, grade and school track.

Table 4.3 Young adolescent's reading frequency as a function of the overall sample, grade and school track

	Never	Rarely	Occasionally	Frequently	Very frequently	Total
	%	%	%	%	%	%
Overall sample	18.7	30.8	22.0	20.9	7.7	100
Vocational students	26.1	37.0	17.4	15.2	4.3	100
Grade 7	30.4	17.4	26.1	4.3	4.3	100
Grade 9	21.7	30.4	17.4	26.1	4.3	100
Pre-academic students	11.1	24.4	26.7	26.7	11.1	100
Grade 7	4.5	18.2	45.5	18.2	13.6	100
Grade 9	17.4	30.4	8.7	34.8	8.7	100

To investigate whether students from different grades and school tracks differed in their reading frequency, non-parametric Mann-Whitney U tests for independent samples were conducted. These analyses yielded that in general, 7th and 9th graders did not differ in reading frequency (Z=-.43, p=.67). More detailed analyses revealed that vocational as well as pre-academic students 7th graders did not read more often than their peer-students in grade 9 (Z=-1.48, p=.14 and Z=-.77, p=.44, respectively). At first sight these results are misleading as vocational and pre-academic students

show actually a different reading frequency pattern. While vocational students show a slight increase in reading frequency between 7th and 9th grade (34.7% reads occasionally or more often in 7th grade compared to 47.8% in 9th grade), pre-academic students rather show a slight decrease in reading frequency between 7th and 9th grade (77.3% reads occasionally or more often in 7th grade compared to only 52.2% in 9th grade).

Furthermore, the analyses revealed that pre-academic students read more often than vocational students (Z=-2.68, $p<.01$): 64.5% of the pre-academic students indicate to read occasionally or more often, compared to only 36.9% of the vocational students. Specific analyses for grade yielded that pre-academic 7th graders read significantly more often than vocational 7th graders (Z=-3.33, $p<.001$): 77.3% of the pre-academic 7th graders read occasionally or more often compared to only 34.7% of the vocational 7th graders. In 9th grade, vocational and pre-academic students do not differ much in reading frequency (Z=-.68, $p=.50$): 47.8% of the vocational 9th graders and 52.2% of the pre-academic 9th graders indicate that they read occasionally or more often. These findings confirm that vocational students are comparable to pre-academic students concerning reading frequency. In search of explanations for these findings, especially pre-academic students mentioned lack of the time and energy because of home work and other obligations as excuses for their rather infrequent reading behaviour.

Next to reading frequency, young adolescents were asked to indicate their favourite reading materials out of four options: books, magazines, comics or newspapers. In Table 4.4 young adolescents' favourite reading materials are presented as a function of the overall sample, grade and school track.

Table 4.4 Young adolescent's favourite reading materials as a function of the overall sample, grade and school track

	Books	Magazines	Newspaper	Comics	Total
	%	%	%	%	%
Overall sample	48.8	44.0	6.6	1.1	100
Vocational students	37.0	50.0	10.9	2.1	100
Grade 7	30.4	47.8	0.0	21.7	100
Grade 9	43.5	52.2	4.3	0.0	100
Pre-academic students	60.0	37.8	0.0	2.2	100
Grade 7	54.5	45.5	0.0	0.0	100
Grade 9	65.2	30.4	0.0	4.3	100

Analyses with the chi-square test revealed that young adolescents' favourite reading materials do not differ among the grade or school track young adolescents attend ($\chi^2_{(3)}=4.57$, $p=.21$ and $\chi^2_{(3)}=6.83$, $p=.08$, respectively). Both vocational and pre-academic students indicate books and magazines far

more often as their favourite readings than comics and newspapers. Furthermore, it was revealed that vocational and pre-academic 7th graders do not indicate other reading materials as their favourite than their peer-students in 9th grade ($\chi^2_{(3)}$=6.57, p=.08 and $\chi^2_{(2)}$=1.84, p=.40, respectively). Finally, it was revealed that in 7th grade vocational and pre-academic actually did differ in their favourite reading materials ($\chi^2_{(2)}$=6.43, p<.05). This difference may be attributed to the higher preference for comics of vocational 7th graders compared to pre-academic 7th graders: 21.7% versus 0.0%, respectively. In 9th grade no significant differences in their favourite reading materials were revealed ($\chi^2_{(3)}$=4.32, p=.23). When asking for examples of favourite books, young adolescents mentioned novels, detectives and war books as their favourite. Furthermore, boys indicated car and football magazines as their favourite magazines whereas girls rather like to read magazines on fashion and pop stars. When young adolescents read comics, the Donald Duck turned out to be very popular.

4.2.2 World knowledge

To get an idea whether young adolescents follow the news and are aware of what is happening in the world, participants were questioned about their frequency of reading the newspaper and watching the newscast. Table 4.5 shows young adolescents' newspaper reading frequency as a function of the overall sample, grade and school track.

Table 4.5 Young adolescents' newspaper reading frequency as a function of the overall sample, grade and school track

	Never	Rarely	Occasionally	Frequently	Very frequently	Total
	%	%	%	%	%	%
Overall sample	19.6	30.4	13.0	30.4	6.5	100
Vocational students	34.8	34.8	23.9	6.5	0.0	100
Grade 7	43.5	26.1	21.7	8.7	0.0	100
Grade 9	26.1	43.5	26.1	4.3	0.0	100
Pre-academic students	22.2	24.4	20.0	26.7	6.7	100
Grade 7	22.7	36.4	9.1	27.3	4.5	100
Grade 9	21.7	13.0	30.4	26.1	6.7	100

To investigate whether students from different grades and school tracks differ in newspaper reading frequency, non-parametric Mann-Whitney U tests for independent samples were conducted. These analyses yielded that in general, 7th and 9th graders do not differ in newspaper reading frequency (Z=-1.03, p=.31). More detailed analyses revealed that vocational and pre-academic students in 9th grade do not read the newspaper more often than their peer-students in 7th grade (Z=-.66, p=.51 and Z=-.83, p=.41, respectively). Furthermore, the analyses revealed that pre-academic students read the newspaper more often than vocational students (Z=-2.61, p<.01): 53.4% of the pre-

academic students indicate to read the newspaper occasionally or more often compared to only 30.4% of the vocational students. More specific analyses revealed, however, that in 9th grade pre-academic students read the newspaper more often than vocational students (Z=-2.21, $p<.05$): 63.2% of the pre-academic 9th graders read the newspaper occasionally or more often compared to only 30.4% of the vocational 9th graders. In 7th grade, vocational and pre-academic students do not differ much in newspaper reading frequency (Z=-1.61, $p=.11$). While filling in the questionnaire, young adolescents remarked quite often that they read the newspaper mainly because they are interested in the sports quire.

Table 4.6 shows young adolescents' newscast watching frequency as a function of grade, school track and the overall sample. Also, for newscast watching frequency it was examined whether young adolescents from different grades and school tracks differ. Non-parametric Mann-Whitney U tests for independent samples yielded that in general, 7th and 9th graders and pre-academic and vocational students do not differ in newscast watching frequency (Z=-.19, $p=.85$ and Z=-.53, $p=.60$). In general, about 49.9% of the young adolescents watch the newscast occasionally or more often, whereas about 50.1% of the young adolescents watch the newscast rarely or less often. More specific analyses revealed the same picture: in both grades vocational and pre-academic students watch just as infrequent the newscast (Z=-.28, $p=.78$ and Z=-.43, $p=.67$, respectively) and vocational as well as pre-academic students 7th graders do not differ in newscast watching frequency compared to peer-students in grade 9 (Z=-.06, $p=95$, and Z=-.19, $p=.85$, respectively).

Table 4.6 Young adolescents' newscast watching frequency as a function of the overall sample, grade and school track

	Never	Rarely	Occasionally	Frequently	Very frequently	Total
	%	%	%	%	%	%
Overall sample	4.4	27.5	44.0	18.7	5.5	100
Vocational students	6.5	26.1	45.7	17.4	4.3	100
Grade 7	4.3	26.1	52.2	13.0	4.3	100
Grade 9	8.7	26.1	39.1	21.7	4.3	100
Pre-academic students	2.2	28.9	42.2	20.0	6.7	100
Grade 7	0.0	31.8	45.5	13.6	9.1	100
Grade 9	4.3	26.1	39.1	26.1	4.3	100

Finally, the correlations between reading frequency, newspaper reading frequency and newscast frequency were investigated. It was found that reading the newspaper and watching the newscast are significantly correlated (Spearman r=.36, $p<.001$). Young adolescents who read the newspaper regularly usually also watch the newscast on a regular basis and vice versa.

4.3 Riddle comprehension

Before the actual analyses on riddle comprehension could start, first the differences in comprehension and explanation orientation between the two versions of the Riddle test were examined. No significant differences were shown. Additionally, it was examined whether a learning effect occurred during the examination of the Riddle test. For both versions using paired-sample T tests the explanations and the explanation orientations of the first five riddles of the Riddle test were compared to the explanation and the explanation orientations of the last five riddles. These analyses yielded for explanation and explanation orientation for both versions that when riddles were presented at the end of the Riddle test they were comprehended more completely and more often explained with the correct knowledge than when the same riddles were presented at the beginning of the Riddle test. The differences were, however, not significant. These findings indicate that a little learning effect took place and that young adolescents became somewhat more trained in riddle explanation and comprehension as the Riddle test examination progressed. This finding is a good indication for the necessity and usefulness of using two versions in which test items are counterbalanced and by which learning effects are minimized. The scores of both Riddle test versions were joined for the remaining analyses on riddle comprehension and explanation orientation.

4.3.1 Riddle comprehension

To determine to what extent young adolescents understood the riddles, they were asked to explain the riddles to the experimenter. As such, participants' explanations were used as a measure for their level of comprehension. It was examined whether participants had understood the riddle fully and if they were able to demonstrate that by giving a complete riddle explanation. To determine the level of comprehension, scores for the degree of comprehension were assigned to all riddles. Therefore, three scores were distinguished: no or wrong comprehension (0), partial comprehension (1) and full comprehension (2) (see also section 3.4.2). By way of illustration, the following examples provide a good idea of when which score is assigned.

Q: Waarom loopt een Belg op maandag naast zijn fiets?

Why walks a Belgian next to his bike on Monday?

A: Omdat het weekend erop zit.

Because the weekend is over. In Dutch the part 'erop zitten' refers to that the weekend is over, but may in this context also refer to that the weekend is sitting on the bike.

0 = No or wrong comprehension

Abdi (9th grade, vocational): *"Because he wants to go out, but he does not know where his bike is. That is why he has to walk".*

1 = Partial comprehension

Ivo (9th grade, pre-academic): *"He cycles only during the weekends, and now the weekend is over, he is walking instead of cycling."*

2 = Full comprehension

Tom (7th grade, vocational): *"Well, he walks next to his bike because the weekend sits on the bike. Actually, they mean that the weekend is over."*

Subsequently, mean scores for the riddle categories were computed by counting the scores of the individual riddles per category and dividing this sum score by the number of riddles per category. Table 4.7 lists the riddle comprehension means for the four riddle categories as a function of the overall sample, grade and school track.

Table 4.7 Riddle comprehension means as a function of the overall sample, grade and school track

	Meaning-Form ambiguity		Lexical ambiguity		Sentence ambiguity		Conceptual		Total	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Overall sample	1.34	.50	1.63	.39	1.35	.54	1.74	.30	1.52	.35
Grade										
Grade 7	1.23	.43	1.56	.41	1.24	.50	1.69	.31	1.43	.32
Grade 9	1.45	.55	1.71	.35	1.46	.56	1.79	.29	1.60	.36
School track										
Vocational	1.07	.50	1.45	.42	1.14	.56	1.64	.30	1.32	.34
Pre-academic	1.62	.32	1.82	.23	1.57	.43	1.85	.26	1.72	.22
Vocational										
Grade 7	.99	.40	1.37	.43	1.14	.51	1.64	.29	1.29	.32
Grade 9	1.15	.58	1.53	.39	1.14	.61	1.64	.32	1.37	.36
Pre-academic										
Grade 7	1.49	.29	1.76	.27	1.35	.49	1.75	.33	1.59	.24
Grade 9	1.75	.30	1.88	.17	1.78	.22	1.95	.13	1.83	.12

Note: Minimum = 0, maximum = 2.

Overall, young adolescents comprehended the conceptual riddles (*M*=1.74) the best, followed by the lexical ambiguity riddles (*M*=1.63). The sentence ambiguity and the meaning-form ambiguity riddles were comprehended the least (*M*=1.35 and *M*=1.34, respectively). To investigate whether young

adolescents from different grades and different school tracks differ in riddle comprehension for the four riddle categories, a 4 x 2 x 2 MANOVA with riddle category as within-subjects factor, and grade and school track as between-subjects factors was conducted.

No three-way interaction was found for the explanation completeness between riddle category, grade and school track ($F_{(3,261)}$=2.37, p=.07, $\eta^2_{partial}$=.03). In the overall sample, the MANOVA yielded a large significant main effect for riddle category ($F_{(3,261)}$=38.74, p<.001, $\eta^2_{partial}$=.46), which means that riddle comprehension differed significantly for the four riddle categories. Post-hoc analyses (for the whole sample) with paired samples T-test revealed that the differences in riddle comprehension were significant for every two riddle categories, with exception of the meaning-form ambiguity and sentence-ambiguity riddles. Furthermore, the riddle comprehension of one riddle category was predictive for the riddle comprehension of another riddle category, since the Pearson correlations turned out positive and significant (see Table B, Appendix 7). These findings fully support hypothesis 1, which predicted that also for young adolescents riddle comprehension would be related to the metalinguistic complexity of the riddles and that the conceptual and lexical ambiguity riddles would be better comprehended than the meaning-form and sentence ambiguity categories. The degree to which young adolescents comprehend riddles is thus dependent on the metalinguistic complexity that is involved. The riddles which require no or the least metalinguistic activity like the conceptual and lexical ambiguity riddles are better explained and thus better comprehended than the meaning-form ambiguity and the sentence ambiguity riddles which require the most metalinguistic activity. Subsequently per riddle category it was examined whether young adolescents from different grades and school tracks differ in the explanations they give as this may unravel who is most progressed in its metalinguistic development.

The MANOVA yielded no significant interaction effect between riddle category and grade (F<1), which indicates that the riddle comprehension sequence was similar for both grades. Furthermore, a significant main effect for grade was found ($F_{(1,89)}$=5.75, p=<.025, $\eta^2_{partial}$=.06). As illustrated in Figure 4.3, 9th graders demonstrated compared to 7th graders better riddle comprehension on all riddle categories. One-way ANOVA's (for the joint tracks) directed at the riddle categories separately, resulted, however, only in a clear significant difference for riddles belonging to the meaning-form category ($F_{(1,89)}$=4.44, p<.05, η^2=.05). The 9th graders comprehended these riddles significantly better than the 7th graders did (M=1.60 and M=1.43, respectively).

Additionally, for each of the school tracks the difference in riddle comprehension between 7th and 9th grade was compared. Specific ANOVA's revealed that the vocational 9th graders did not comprehend the riddles better than their peer-students in 7th grade. Although slight improvements could be observed for meaning-form ambiguity and lexical ambiguity (see Figure 4.3), for none of the riddle categories significant differences were measured between 7th and 9th grade (meaning-form: $F_{(1,45)}$=1.22, p=.28, η^2=.03; lexical: $F_{(1,45)}$=1.76 , p=.19, η^2=.04; sentence: F<1 and conceptual:

F<1). The analyses revealed a different picture for the pre-academic students (see Figure, 4.4), since pre-academic 9th graders actually comprehended the riddles significantly better than their peer-students in 7th grade (meaning-form: $F_{(1,44)}$=8.96, p<.005, η^2=.18; sentence: $F_{(1,44)}$=14.94, p<.001, η^2=.26 and conceptual: $F_{(1,44)}$=7.07, p<.05, η^2=.14). Only for riddles belonging to the lexical ambiguity category no significant difference was measured between 7th and 9th grade ($F_{(1,44)}$=3.16, p=.08, η^2=.07). It is interesting to notice that the largest improvements are measured for the riddle categories which require the most complex metalinguistic activity. However, it should be noticed that compared to the other riddle categories, for the sentence ambiguity category also the most improvement was to be obtained.

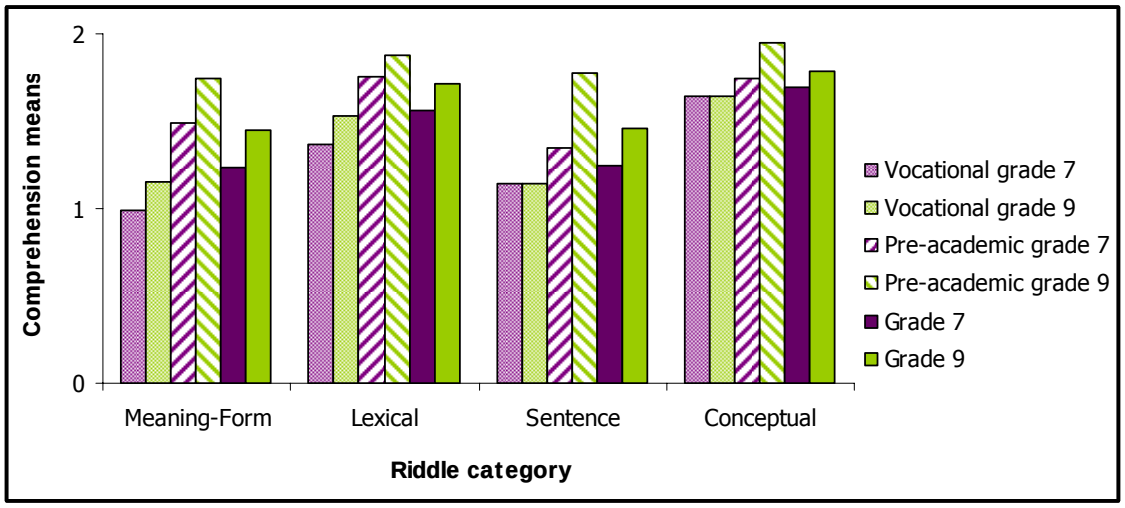

Figure 4.3 Riddle comprehension means as a function of grade

The findings on riddle comprehension support hypothesis 2, which predicted that riddle comprehension would be related to grade and that young adolescents attending 9th grade would show better riddle comprehension than young adolescents attending 7th grade. In general, 9th graders compared to 7th graders improve in riddle explanation and thus in riddle comprehension. Regrettably, this conclusion is a bit too optimistic as specific analyses revealed that vocational 9th graders do not show better riddle comprehension than vocational 7th graders and that thus riddle comprehension of vocational students seems to stagnate between 7th and 9th grade. Therefore, the conclusion only holds for the pre-academic students. As a consequence of these results, hypothesis 3b is confirmed: vocational students clearly show a different pattern of riddle comprehension compared to the pre-academic students. While the improvement of riddle comprehension of vocational students between 7th and 9th grade seems to stagnate; pre-academic 9th graders show on riddles that require the most complex metalinguistic activity clear improvement compared to their peer-students in 7th grade.

Also for school track, a more simplified 2 x 4 MANOVA with riddle category as within-subjects factor and school track as between-subjects factor was conducted. The MANOVA yielded a significant interaction effect between riddle category and school track ($F_{(1,89)}$=14.98, p<.001, $\eta^2_{partial}$=.06). Also, for school track a significant main effect was found ($F_{(1,89)}$=45.30, p<.001, $\eta^2_{partial}$=.52). These findings indicate that the pre-academic students comprehended the riddles significantly better than the vocational students and that riddle comprehension is dependent on school track. One-way ANOVA's directed at the riddle categories separately, resulted in significant differences between school track for the four riddle categories (meaning-form: $F_{(1,90)}$=39.02, p<.001, η^2=.31; lexical: $F_{(1,90)}$=27.13, p<.001, η^2=.23; sentence: $F_{(1,90)}$=17.06, p<.001, η^2=.16 and conceptual: $F_{(1,90)}$=12.36, p<.001, η^2=.12). As illustrated in Figure 4.4, the pre-academic students comprehended all riddle categories better than the vocational students. Post-hoc analyses with paired-samples T tests revealed that pre-academic students comprehended the riddles better than the vocational students, but that the sequence of comprehension was similar: conceptual > lexical ambiguity > meaning-form ambiguity > sentence ambiguity.

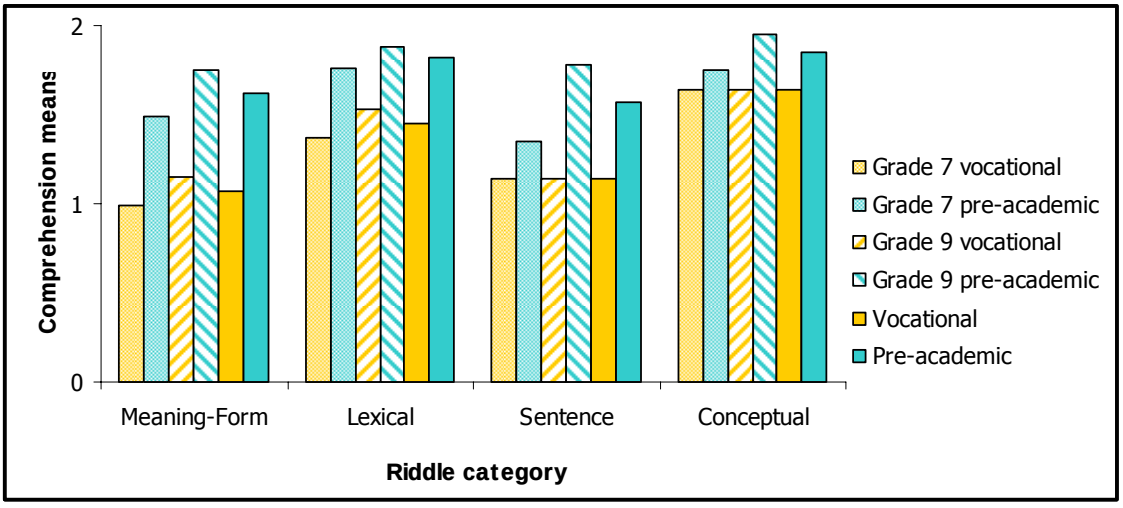

Figure 4.4 Riddle comprehension means as a function of school track

Additionally, for each of the grades the difference in riddle comprehension between vocational and pre-academic students was compared. In 7th grade, the pre-academic students comprehended the meaning-form and the lexical ambiguity riddles significantly better than the vocational students ($F_{(1,44)}$=22.47, p<.001, η^2=.34 and $F_{(1,44)}$=12.81, p<.001, η^2=.23, respectively). For the sentence ambiguity and conceptual riddles no significant differences in riddle comprehension between vocational and pre-academic students were shown ($F_{(1,44)}$=2.01, p=.161, η^2=.05 and $F_{(1,44)}$=1.39, p=.25, η^2=.03, respectively). In 9th grade, the pre-academic students showed significant better riddle comprehension for even all four riddle categories than the vocational students (meaning-form: $F_{(1,45)}$=19.36, p<.001, η^2=.31; lexical: $F_{(1,45)}$=15.22, p<.001, η^2=.26; sentence: $F_{(1,45)}$=22.46, p<.001, η^2=.34 and conceptual: $F_{(1,45)}$=18.04, p<.001, η^2=.29). In Figure 4.4 the measured

differences are clearly visible. It is not by chance that the largest effects are measured for the riddle categories for which pre-academic students show the largest comprehension progression between 7th and 9th grade: the meaning-form and sentence ambiguity riddles. Furthermore, the finding that the difference in riddle comprehension is increased between vocational and pre-academic students in 9th compared to 7th grade can be explained by the fact that pre-academic progress in riddle comprehension between 7th and 9th grade, while vocational students stagnate.

These findings on riddle comprehension in relation to school track support hypothesis 3a, which stated that school track would be related to riddle comprehension, and that therefore pre-academic students would show better riddle comprehension compared to vocational students. The ability to give complete riddle explanations and riddle comprehension is clearly dependent on the school track young adolescents attend. The interdependence even increases when higher grades are attended since the difference between vocational and pre-academics is present for more riddle categories in 9th than in 7th grade.

As linguistic riddles appeal to metalinguistic activity and metalinguistic skills are closely related to other language skills, riddle comprehension is expected to be related to the linguistic competences of young adolescents. To test this prediction, the correlations between riddle comprehension and linguistic competence for the four riddle categories were calculated. As expected, high and positive correlations were found for all four riddle categories (see Table C, Appendix 7). Both the percentile score for language in the *Cito Eindtoets* and the Reading Vocabulary score correlated significantly and positively with the riddle comprehension means of all four riddle categories. These findings fully support hypothesis 4, which stated that riddle comprehension would be related to linguistic competence and that young adolescents with better linguistic competences would show better riddle comprehension than young adolescents with weaker linguistic competences. As one may expect, good linguistic competences support the ability to comprehend riddles that require metalinguistic activity and weaker linguistic competences will result in an opposite effect: weak linguistic competences hinder comprehension of riddles requiring activities for which language knowledge and skills have to be used.

Because reading skills and world knowledge are intuitively expected to be related to riddle comprehension, it was examined whether riddle comprehension was correlated with reading frequency, newspaper reading frequency and newscast watching frequency. Using the Spearman correlation, only one significant correlation was found: reading frequency correlated significantly and positively with the comprehension mean score of the sentence ambiguity riddles (Spearman $r=.22$, $p<.05$). These findings reject hypothesis 5a, which stated that young adolescents who read more frequently would show better riddle comprehension than young adolescents who hardly read. Reading frequently is as such not as influencing on riddle comprehension as expected. Since no correlations at all were found for newspaper reading frequency and newscast frequency hypothesis

5b is also rejected. Young adolescents who regularly follow the news comprehended the riddles not substantially better than young adolescents who hardly follow the news by reading the newspaper or watching the newscast. Apparently, the riddles in the test did not require such specific world knowledge for which following the news was required. Or, these findings indicate that young adolescents who regularly follow the news were not in advantage concerning riddle comprehension compared to young adolescents who hardly follow the news. Looking back, this is only an additional proof of the reliability of the Riddle test.

The preceding findings revealed that grade as well as school track and linguistic competence are positively correlated with riddle comprehension of young adolescents. In respect of the discussion between researchers as Gombert (1992) and Bialystok (1981) it is interesting to analyse which kind of knowledge people use to execute metalinguistic tasks and to what extent this type of knowledge determines the achievement of the task. Therefore, the correlations between the scores for explanation orientation (see section 3.4.1) and riddle comprehension for the four riddle categories were calculated. In accordance with Gombert's (1992) and contrary to Bialystok's (1981) reasoning, high positive and significant correlations were found for all four riddle categories (see Table D, Appendix 7). Up to this point, four factors are predictive for the variance in riddle comprehension. In this respect, it is interesting to find out which factors are contributing most to the variance in riddle comprehension. Using a multiple-regression analysis, the relative contribution of grade, school track, linguistic competences and explanation orientation to riddle comprehension was examined. Using the stepwise method, a significant model emerged ($F_{(1,90)}$=341.74, p<.001, Adjusted R square =.88, MSE=.12). Table 4.8 lists the significant predictors for the riddle comprehension of the overall sample.

Table 4.8 Significant predictors for riddle comprehension as a function of the overall sample (n=91)

	B	Standard Error	Beta	t	*p*
Explanation orientation	.11	.00	.87	20.57	p<.001
Score on Reading Vocabulary Test	.01	.00	.12	2.86	p<.005

The multiple regression analysis shows that the explanation orientation is contributing most to the variance in riddle comprehension (p<.001), followed by the score on the Reading Vocabulary test (p<.005). These two significant predictors account together for 88.3 % of the variance in riddle comprehension. School track and grade as well as the score for language on the *Cito Eindtoets* do not contribute to the variance in riddle comprehension because of the strong mutual correlations. As explanation orientation has such a large effect on riddle comprehension (Beta=.87), the next section deals in more detail with the differences in type of knowledge young adolescents use to comprehend and explain riddles.

4.3.2 Explanation orientation

As was expected that the 'explanation orientation' would provide insight in the degree of riddle comprehension, the riddle explanations were also analyzed on which type of knowledge participants used to explain the riddles: knowledge of the world, or also knowledge of the functioning and characteristics of language. This way, the so-called 'orientation of the explanation' was determined and orientation labels were assigned. The previous section revealed that the explanation orientation indeed strongly predicted the degree of riddle comprehension. Therefore, the explanation orientations are further analyzed to find out which type of young adolescents use which type of knowledge, and which factors contribute to the differences in riddle orientation and thus to the variance in riddle comprehension and metalinguistic awareness.

In this respect, three orientations were distinguished: no or an unclear orientation (0), only world-oriented (1) and next to world-oriented also language-oriented (2). The following examples of participants' explanations provide a good idea of when which orientation label was assigned.

Q: Wat staat er op een Turkse botsauto?
What is written on a Turkish bumper car?
A: Ramadan.
Ramadan is a feast that many Turkish people celebrate and when Ramadan is slowly pronounced, like Ram-me-dan, it refers in Dutch to 'hit me'.

<u>0 = No or unclear orientation</u>
Robin (7th grade, vocational): *"A Turkish bumper car? (Yes) I do not understand it. (What is the Ramadan?) Yes, I have heard about it, but I do not really know what it is."*

<u>1 = Only world-oriented</u>
Rob (7th grade, vocational): *"Ramadan means that people are not allowed to eat and drink. It is written on the bumper car because people are not allowed to eat and drink in bumper cars."*

<u>2 = Next to world-oriented also language-oriented</u>
Anneloes (9th grade, pre-academic): *"Okay, the Turkish celebrate Ramadan. But if you pronounce Ramadan slowly, than you get ram-me-dan, which means that you have to bump into the car. And one bump into each other with bumper cars."*

Table 4.9 lists the relative frequencies of the three explanation orientations as a function of the overall sample, grade and school track. When interpreting the data in Table 4.9, it should be kept in mind that for the linguistic riddle categories (meaning-form, lexical and sentence) a language-orientation next to world-orientation is required to comprehend and explain the riddle completely, while for the conceptual riddles only a world orientation is sufficient.

Table 4.9 Relative frequency of explanation orientation as a function of the overall riddle sample, grade and school track

	Meaning-form ambiguity			Lexical ambiguity			Sentence ambiguity			Conceptual		
	0	1	2	0	1	2	0	1	2	0	1	2
	%	%	%	%	%	%	%	%	%	%	%	%
Overall sample	23.6	12.6	63.8	6.3	15.7	78.0	15.4	21.2	63.4	5.0	95.0	0.0
Grade												
Grade 7	27.8	12.8	59.4	8.9	17.2	73.9	16.1	27.2	56.7	6.1	93.9	0.0
Grade 9	19.6	12.5	67.9	3.8	14.1	82.1	14.7	15.2	70.1	3.8	96.2	0.0
School track												
Vocational	31.5	17.4	51.1	10.3	20.7	69.0	22.8	24.5	52.7	7.6	92.4	0.0
Grade 7	34.8	17.4	47.8	14.1	18.5	67.4	19.6	28.3	52.1	7.6	92.4	0.0
Grade 9	28.3	17.4	54.3	6.5	22.8	70.7	26.1	20.7	53.2	7.6	92.4	0.0
Pre-academic	15.6	7.8	76.6	2.2	10.6	87.2	7.8	17.8	74.4	2.2	97.8	0.0
Grade 7	20.5	8.0	71.5	3.4	15.9	80.7	12.5	26.1	61.4	4.5	95.5	0.0
Grade 9	10.9	7.6	81.5	1.1	5.4	93.5	3.3	6.5	87.0	0.0	100.0	0.0

0 = no or unclear orientation, 1 = only world-oriented and 2 = next to world-oriented also language-oriented

Logically, for the conceptual riddles even 95% of the explanations showed that the young adolescents had used their knowledge of the world to explain this kind of riddle. For the linguistic riddle categories, the percentages for correct knowledge use were substantially lower (63.8%, 78.0% and 63.4%), by which the explanations of the lexical ambiguity riddles demonstrated the most correct orientations (78.0%). When the explanations for lexical ambiguity and sentence ambiguity showed no language-orientation, more world-orientations were demonstrated than no or unclear orientations. Only, for the meaning-form riddles it was the other way around. The same picture is revealed when the explanation orientations of 7th and 9th graders were compared. Also, when the explanation orientation for the school tracks separately between 7th and 9th grade were compared, the picture did not change.

Another picture is yielded, however, when the explanation orientations of vocational and pre-academic students were compared. For the linguistic riddles, the pre-academic students gave clearly more explanations that indicated the use of knowledge of the functioning and characteristics of language than that the explanations of the vocational students this indicated. Particularly, for the meaning-form ambiguity and sentence ambiguity riddles the differences were substantially (51.1% versus 76.6% and 52.7% versus 74.4%, respectively). Furthermore, it is shown that the explanations of vocational students demonstrate more often no or an unclear orientation compared to the explanations of pre-academic students. This picture holds when the explanation orientations between the vocational and the pre-academic students for each of the grades were compared. In both grades, the pre-academic students compared to vocational students used more often their knowledge on language for the explanation of the linguistic riddles. As one may expect, the number of correct explanation orientations of the conceptual riddles differed hardly between the vocational and pre-academic students. The young adolescents in both school tracks explained these riddles by making use of their knowledge about the world.

For the benefit of the remaining analyses it was decided to count the number of times young adolescents made use of the correct knowledge to explain the riddles. Therefore, for the linguistic riddle categories, the number of times participants used language knowledge next to knowledge of the world were counted. The same was done for the conceptual riddles with the difference that the number of times participants used world knowledge to explain the riddles were counted. Because of the switch from relative frequencies to counts, analyses of variances were used for the subsequent in-depth analyses. Table 4.10 lists per riddle category the total number of times participants using the correct knowledge for riddle explanation as a function of the overall sample.

Table 4.10 Sum scores for number of correct orientation demonstrations as a function of the overall sample, grade and school track

	Meaning-Form ambiguity		Lexical ambiguity		Sentence ambiguity		Conceptual		Total	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Overall sample	2.55	1.08	3.12	.95	.63	.29	3.80	.45	12.01	2.69
Grade										
Grade 7	2.38	.94	2.96	.90	.57	.27	3.76	.48	11.36	2.38
Grade 9	2.72	1.19	3.28	.98	.70	.31	3.85	.42	12.65	2.85
School track										
Vocational	2.04	1.13	2.76	1.04	.53	.30	3.70	.51	10.61	2.65
Pre-academic	3.07	.72	3.49	.69	.74	.25	3.91	.36	13.44	1.85
Vocational										
Grade 7	1.91	.90	2.70	.93	.52	.58	3.70	.47	10.39	2.43
Grade 9	2.17	1.34	2.83	1.15	.53	.33	3.70	.56	10.83	2.90
Pre-academic										
Grade 7	2.86	.71	3.23	.81	.61	.25	3.82	.50	12.36	1.89
Grade 9	3.26	.69	3.74	.45	.87	.17	4.00	.00	14.48	1.08

Note: Minimum = 0, maximum = 4 (riddle categories) or maximum = 16 (overall riddle sample)

Overall, young adolescents used for the conceptual riddles the most number of times the correct knowledge (world knowledge) to explain the riddles (*M*=3.80). Then participants demonstrated for the lexical ambiguity riddles, followed to the meaning-form ambiguity the most number of times that they used the correct knowledge (*M*=3.12 and *M*=2.55, respectively). The least number of correct orientation demonstrations was counted for the sentence ambiguity riddles (*M*=.63). To investigate whether young adolescents from different grades and school tracks differ in the knowledge they use for riddle comprehension, a 4 x 2 x 2 MANOVA with riddle category as within-subjects factor, and grade and school track as between-subjects factors was conducted.

No three-way interaction was found between riddle category, grade and school track (F<1). In the overall sample, the MANOVA yielded a significant main effect for riddle category ($F_{(3,261)}$=394.69, p<.001, $\eta^2_{partial}$= 4.54), which means that the explanations for the riddle categories significantly differed in the number of times in which the correct knowledge was used for explanation. Post-hoc analyses with paired-samples T tests revealed that the differences were significant for every two riddle categories. Furthermore, the number of correct orientation demonstrations of one riddle category was highly predictive for the number of correct orientation demonstrations of another category, since all correlations were positive and significant (see Table E, Appendix 7).

The MANOVA yielded no significant interaction effect between riddle category and grade (F<1), which indicates that the sequence of the number of times that participants used the correct knowledge for

explanation was similar in both grades and comparable to the sequence that was found for the overall sample. Furthermore, a significant main effect for grade was revealed ($F_{(1,89)}$=4.79 p<.05, η^2=.05). The 9th graders gave in general significantly more explanations using the correct knowledge than 7th graders (M=11.36 and M=12.65, respectively). One-way ANOVA's (for the joint tracks) directed at the four riddle categories separately, resulted remarkable in only a significant difference for the sentence ambiguity riddles ($F_{(1,90)}$=4.88, p<.05, η^2=.05). Just for this riddle category, which require the most complex metalinguistic activity, 9th graders used more often the correct knowledge for explanation than 7th graders did (M=.70 and M=.57, respectively).

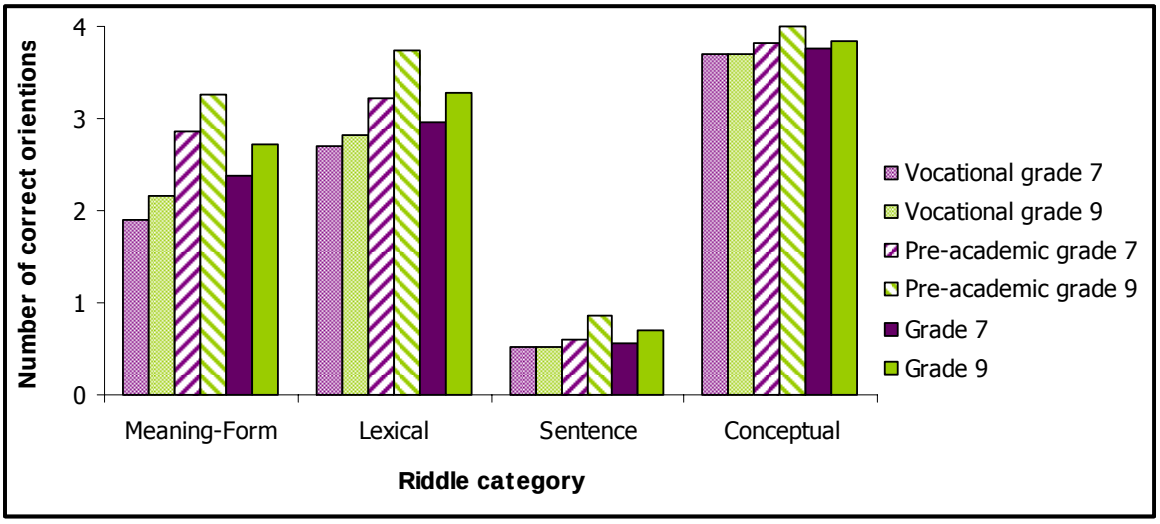

Figure 4.5 Sum scores for number of correct orientation demonstrations as a function of grade

Additionally, for each of the school tracks, the difference in number of correct orientation demonstrations between 7th and 9th grade was compared. Specific one-way ANOVA's revealed that vocational 9th graders used the correct knowledge more often compared to their peer-students in 7th grade. For none of the riddle categories significant differences between 7th and 9th grade were obtained (F<1 for all riddle categories). On the contrary, it was revealed that the pre-academic 9th graders for two riddle categories actually used more often the correct knowledge compared to their peer-students in 7th grade. For riddles belonging to the lexical ambiguity and sentence ambiguity category significant differences were obtained ($F_{(1,44)}$=6.92 p<.025, η^2=.14 and $F_{(1,44)}$=16.24 p<.001, η^2=.26).

Also, for school track a more simplified 2 x 4 MANOVA, with riddle category as within-subjects factor and school track as between-subjects factor was conducted. The MANOVA yielded a significant interaction effect between riddle category and school track $F_{(3,267)}$=8.58 p<.001, η^2=.10). Furthermore, a large significant main effect for school track was found ($F_{(1,89)}$=39.09 p<.001, η^2=.44). As visualized in Figure 4.6, the pre-academic students compared to the vocational students used significantly more often the correct knowledge for explanation (M=10.61 and M=13.44, respectively). One-way ANOVA's directed at the riddle categories separately resulted in significant differences between school tracks for all four riddle categories. Pre-academic students explained the riddles clearly more often by making use of the required knowledge compared to the vocational students. Post-hoc analyses with paired-samples

T tests revealed that pre-academic students made more often use of the correct knowledge for explanation than the vocational students, but that the sequence was similar for both school tracks and comparable to the sequence found for the overall sample: conceptual > lexical ambiguity > meaning-form ambiguity > sentence ambiguity.

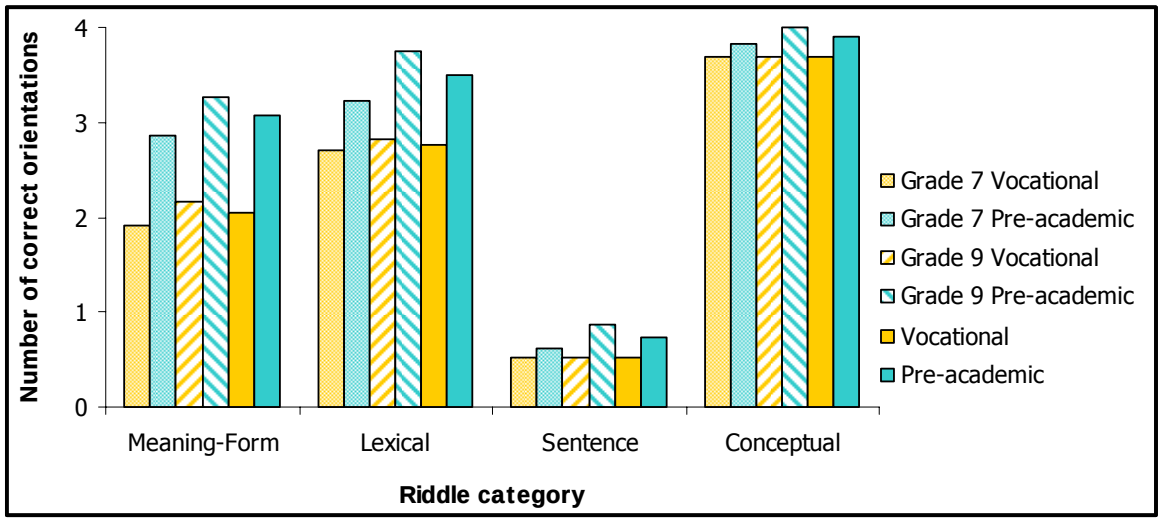

Figure 4.6 Sum scores for number of correct orientation demonstrations as a function of school track

Additionally, for each of the grades, the difference in number of correct orientation demonstrations between vocational and pre-academic students was compared. In 7th grade, the explanations of pre-academic students for both the lexical ambiguity and the meaning-form ambiguity riddles contained significantly more often the correct knowledge compared to the explanations given by the vocational students ($F_{(1,44)}$=15.38, p<.001, η^2=.26 and $F_{(1,89)}$=4.18 p<.05, η^2=.09, respectively). For the conceptual and sentence-ambiguity riddles no significant differences were obtained (F<1, and $F_{(1,44)}$=1.33 p=.26, η^2=.03, respectively). In 9th grade, the pre-academic students explained all riddle categories significantly more often with the correct knowledge than the vocational 9th graders did (meaning-form: $F_{(1,45)}$=12.02 p<.001, η^2=.21; lexical: $F_{(1,45)}$=12.50 p<.001, η^2=.21; $F_{(1,45)}$=19.01 p<.001, η^2=.30 and conceptual: $F_{(1,45)}$=6.82 p<.025, η^2=.13).

Based on the findings for grade and school track, it can be concluded that the type of knowledge young adolescents use to explain the riddles is dependent on the grade and school track young adolescents attend. In general, young adolescents seem to improve in using the correct knowledge to explain the riddles between 7th and 9th grade. However, this conclusion has to be nuanced as specific analyses revealed that vocational 9th graders actually did not give more riddle explanations with the correct knowledge than their peer-students in 7th grade. Unfortunately, the general conclusion only holds for the pre-academic students. Furthermore, pre-academic students show in both grades that they use more often the correct knowledge to explain the riddles than the vocational students. Finally, it may be concluded that the participants explained the conceptual riddles the most with the required knowledge. The lexical ambiguity and meaning-form ambiguity riddles were explained less often with the required

knowledge, and the sentence ambiguity riddles were the least explained by using the correct knowledge.

As linguistic competences turned out to be related to the degree of riddle comprehension, linguistic competences are also expected to be related to the type of knowledge young adolescents use to explain riddles. Therefore, also for explanation orientation it was examined whether it is correlated with the linguistic competences of young adolescents. Positive and significant Pearson correlations were found between the measures for linguistic competence and the overall riddle sample, and between the measures for linguistic competence and the separate riddle categories (see Table F, Appendix 7). These findings indicate that linguistic competences determine the type of knowledge young adolescents use to explain the riddles. The better the linguistic skills of young adolescents, the more often they use it to explain the riddles. Logically, the correlations between the linguistic riddle categories and the measures for linguistic competence are higher than between the conceptual riddle category and the measures for linguistic competence (see Table F, Appendix 7).

The preceding findings indicate that grade as well as school track and linguistic competences are positively correlated to the type of knowledge young adolescents use to explain riddles. In this respect, it is interesting to find out which factor is contributing most to the variance in explanation orientations that young adolescents demonstrate. Using a multiple-regression analysis, the relative contribution of grade, school track and linguistic competence to explanation orientation was examined. Using the stepwise method, a significant model emerged ($F_{(3,90)}$=17.29, p<.001, Adjusted R square =.35, MSE=2.17). Table 4.11 lists the significant predictors for the number of correct explanation orientations given by the young adolescents.

Table 4.11 Significant predictors for the number of correct orientation demonstrations as a function of the overall sample (n=91)

	B	Standard Error	Beta	t	*p*
School track	1.96	.60	.37	3.28	p<.001
Score on Reading Vocabulary test	.12	.06	.26	2.25	p<.05
Grade	.49	.24	.18	2.07	p<.05

The multiple regression analysis shows that school track is contributing most to the variance in the number of times young adolescents explain the riddles by using the correct knowledge (Beta=.37), followed to the score on the Reading Vocabulary test (Beta=.26) and school track (Beta=.18). Together the significant predictors account for 35.2% of the variance in the number of correct orientation demonstrations. The score for language in the *Cito Eindtoets* in the model did not contribute because of the strong correlation with the score on the Reading Vocabulary test (Pearson r=.71, p<.001).

4.4 Riddle appreciation

Zigler et al. (1966) and McGhee (1971) argue that what one finds amusing is dependent on one's intellectual growth and that jokes as such should be based on principles that are just beyond people's current intellectual level. When this reasoning is true, riddle appreciation might be a good indicator for current levels of intelligence and metalinguistic awareness. Therefore, young adolescents riddle appreciation is tested by asking them to give a mark between 1 (very bad) and 5 (very good).

The young adolescents experienced no problems in giving marks by using the Smileyometer. Most young adolescents gave quite resolutely a mark by which they regularly added a specific qualification, like *"I do not think that this is funny at all, I give a 1"* or *"Gee! This is pretty bad. I give a 2"* or "*A 3, as I have heard better ones"* and *"I think this quite funny, so I give a 4".* To compare riddle appreciation between the four riddle categories, mean appreciation marks for the riddle categories were calculated by counting the marks of the individual riddles per category and dividing this sum score by the number of riddles per category. Table 4.12 lists the mean appreciation marks for the four riddle categories as a function of the overall sample.

Before the actual analyses could start, first the appreciation differences between the two versions of the Riddle test were examined. No significant differences between the Riddle test versions were measured. Additionally, it was examined whether a saturation point was reached during the examination of the Riddle test that could have negatively affected the results. For both versions, the appreciation scores for the first five riddles of the Riddle test were compared to the appreciation scores for the last five riddles using paired-samples T tests. These analyses yielded for both versions, that when riddles were presented at the end of the Riddle test, they obtained significantly higher marks than when they were presented at the beginning of the Riddle test. This finding indicates that no point of saturation was reached, but that young adolescents rather became more amused as the examination progressed. Also this finding supports the necessity and usefulness of using two versions in which test items are counterbalanced and through which saturation or habituation effects are minimized. Furthermore, the findings support the rationale for joining the scores of both Riddle test versions for the remaining analyses.

Table 4.12 Mean appreciation marks as a function of grade

	Meaning-Form ambiguity		Lexical ambiguity		Sentence ambiguity		Conceptual		Overall riddle sample	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Overall sample	3.12	.07	3.20	.06	2.71	.07	3.37	.06	3.10	.51
Grade										
Grade 7	3.30	.09	3.29	.09	2.82	.10	3.44	.09	3.21	.38
Grade 9	2.93	.09	3.11	.09	2.60	.10	3.29	.09	2.98	.59
School track										
Vocational	3.14	.66	3.07	.52	2.73	.73	3.39	.59	3.08	.48
Pre-academic	3.08	.68	3.33	.70	2.69	.67	3.35	.57	3.11	.54
Vocational										
Grade 7	3.20	.64	3.05	.31	2.83	.68	3.45	.56	3.13	.41
Grade 9	3.09	.68	3.09	.67	2.63	.78	3.33	.63	3.03	.54
Pre-academic										
Grade 7	3.41	.50	3.53	.49	2.82	.54	3.44	.41	3.30	.32
Grade 9	2.77	.69	3.14	.83	2.56	.77	3.26	.69	2.93	.65

Note: Appreciation scale ranged from 1 (very bad) to 5 (very good).

Table 4.12 and Figure 4.7 show that young adolescents generally appreciated the riddles with a mark that fluctuated around 3 which refers to 'neutral' or to 'not good and not bad'. The sentence ambiguity riddles were an exception to this as the mean appreciation mark turned out somewhere between 2 (bad) and 3 (neutral). Overall, the conceptual riddles were appreciated the most (M=3.37), followed by the lexical ambiguity riddles (M=3.20) and the meaning-form ambiguity riddles (M=3.11). Riddles belonging to the sentence ambiguity category were appreciated the least (M=2.71).

To investigate whether young adolescents from different grades and different school tracks differ in riddle appreciation, a 4 x 2 x 2 MANOVA with riddle category as within-subjects factor, and grade and school track as between-subjects factors was conducted. No three-way interaction was found for appreciation between riddle category, grade and school track ($F_{(3,261)}$=1.68, p=.17, η^2=.02). For the overall sample, the MANOVA obtained a rather large significant main effect for riddle category ($F_{(3,261)}$=35.34, p<.001, $\eta^2_{partial}$=.41), which indicates that the young adolescents were not equally amused by the separate riddle categories. Post-hoc analyses with the paired-samples T tests revealed that the differences in riddle appreciation were significant for every two riddle categories. Furthermore, the appreciation for one riddle category turned out to be predictive for the appreciation of another riddle category, since the Pearson correlations were positive and significant (see Table G, Appendix 7).

These findings support hypothesis 7a to a large extent, which stated that riddle appreciation would be related to the metalinguistic complexity of the riddles and that riddles requiring more metalinguistic activity would be differently appreciated than riddles requiring less or no metalinguistic activity. The conceptual and lexical ambiguity riddles which require no or less metalinguistic activity were appreciated

more than the riddles requiring more metalinguistic ambiguity such as the sentence ambiguity riddles. Only, the meaning-form ambiguity riddles were more appreciated than expected.

The MANOVA showed no significant interaction effect between riddle category and grade ($F_{(3,267)}$=1.06, p=.37, $\eta^2_{partial}$=.01), which indicates that the appreciation sequence was similar in both grades and comparable to the sequence that was found for the overall sample. Thus, the young adolescents' riddle preference did not substantially change when they attend higher grades. Furthermore, a significant main effect for grade was found ($F_{(1,89)}$=4.88 p<.05, $\eta^2_{partial}$=.06). As illustrated in Figure 4.7, the 7th graders gave the riddles significantly higher marks compared to the 9th graders (M=3.21 and M=2.98, respectively). From this, it may be inferred that young adolescents' riddle appreciation decreases when they get older. One-way ANOVA's directed at the four riddle categories separately, resulted remarkably only in a significant appreciation difference for the meaning-form ambiguity riddles ($F_{(1,90)}$=7.64, p<.01, η^2=.08). The 7th graders compared to the 9th graders were clearly more amused by this riddle type (M=3.30 and M=2.93, respectively).

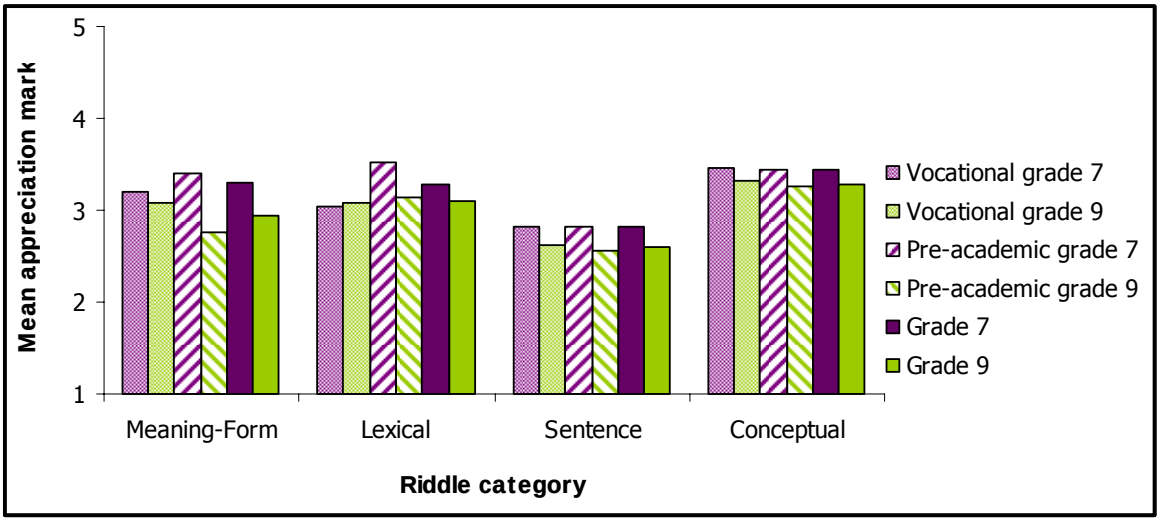

Figure 4.7 Mean appreciation marks for the riddle categories as a function of grade

Additionally, for each of the school tracks the difference in riddle appreciation between 7th and 9th grade was compared. Specific one-way ANOVA's revealed that the riddle appreciation of vocational 7th and 9th graders did not differ significantly. As illustrated in Figure 4.7, vocational 9th graders gave for the conceptual, meaning-form and sentence ambiguity riddles slightly lower marks compared to their 7th grade peer-students. For the lexical ambiguity riddles the vocational 9th graders gave even slightly higher marks than the vocational 7th graders (M=3.09 and M=3.05, respectively). The one-way ANOVA's directed at the pre-academic students demonstrated a rather different picture. In general, pre-academic 9th graders gave clearly lower marks compared to their 7th grade peer-students (M=2.93 versus M=3.30; $F_{(1,44)}$=5.72, p<.025, η^2=.12). However, only for the meaning-form ambiguity riddles a significant difference was obtained ($F_{(1,44)}$=12.63, p<.001, η^2=.23). As visualized in Figure 4.7, the largest difference was demonstrated for the meaning-form ambiguity riddles (M=2.77 versus M=3.41), followed to the lexical ambiguity riddles (M=3.14 versus M=3.53) and the sentence ambiguity riddles (M=2.77

versus *M*=3.41). The smallest difference was shown for the conceptual riddles (*M*=3.26 versus *M*=3.44).

In general these findings are supportive for hypothesis 7b, which stated that riddle appreciation would be related to grade and that 7th graders would show higher riddle appreciation than 9th graders. When it is distinguished between school tracks, it was revealed that hypothesis 7b holds for pre-academic students but not for vocational students. Probably, the riddles remain challenging for vocational students in the time span between 7th and 9th grade, whereas the challenge and as such the appreciation for pre-academic students decreases between 7th and 9th grade.

Also for school track a more simplified 2 x 4 MANVOA with riddle category as within-subjects factor and school track as between-subject factor was conducted. The MANOVA yielded a significant interaction effect between riddle category and school track ($F_{(3,267)}$=2.64, p<.05, $\eta^2_{partial}$=.03). However, no significant main effect for school track was found (F<1). As illustrated in Figure 4.8 the appreciation of the riddle categories is not affected by school track, because vocational and pre-academic students are, with exception of the lexical ambiguity category, quite unanimous in their appreciation of the four riddle categories. One-way ANOVA's directed at the riddle categories separately, revealed only a significant difference for the riddles belonging to the lexical ambiguity category ($F_{(1,90)}$=4.13, p<.05). Pre-academic students were clearly more amused by the lexical ambiguity riddles than the vocational students (*M*=3.33 and *M*=3.07, respectively). Post-hoc analyses with paired-sample T tests revealed that the sequence of riddle appreciation was similar for both school tracks and comparable to the sequence found for the overall sample: conceptual > lexical ambiguity > meaning-form ambiguity > sentence ambiguity.

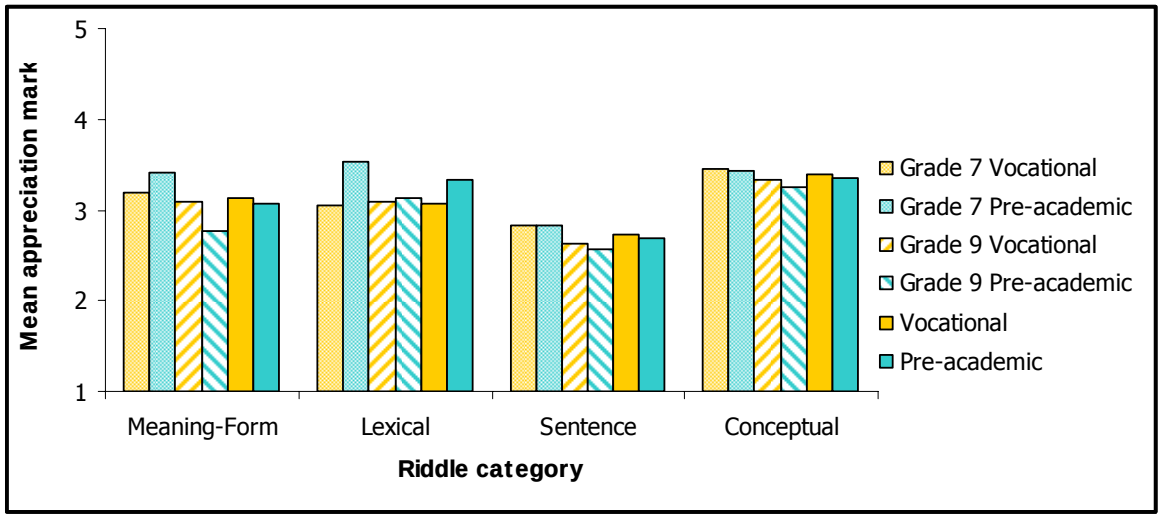

Figure 4.8 Mean appreciation marks as a function of school track

Additionally, for each of the grades the difference in riddle appreciation between vocational and pre-academic students was compared. The specific one-way ANOVA's revealed that in 7th grade, the vocational and pre-academic students only differed in appreciation for the lexical riddles ($F_{(1,90)}$=15.55,

p<.001). As illustrated in Figure 4.8, the pre-academic students gave significantly higher marks for these riddles than the vocational students (*M*=3.53 and *M*=3.05, respectively). In 9th grade, no significant appreciation differences for one of the riddle categories between vocational and pre-academic students were revealed. These findings reject hypothesis 7c, which stated that riddle appreciation is related to school track and that young adolescents attending the vocational school track would appreciate the riddles more compared to young adolescents attending the pre-academic school track. It is not true that school track determines the degree of appreciation for the separate riddle categories as vocational and pre-academic students are quite unanimous in whether they like or dislike a specific riddle category. The grade students attend, does not change anything to this observation.

Following, the correlation between riddle appreciation and linguistic competences were calculated to investigate whether linguistic competences of young adolescents affect riddle appreciation. In general, riddle appreciation was found unrelated to the linguistic competences of young adolescents. For the overall sample, both the percentile score for language on the *Cito Eindtoets* and the Reading Vocabulary score did not correlate significantly with one of the four riddle categories. Therefore it is concluded that linguistic competences of young adolescents do not affect riddle appreciation. Better linguistic competences do not result in higher appreciation of linguistic jokes and neither weaker linguistic competences do result in lower appreciation of linguistic jokes.

Because good reading skills and world knowledge are intuitively expected to support (verbal) riddle appreciation, it was examined whether riddle appreciation and reading frequency, newspaper reading frequency and newscast watching frequency were positively correlated. Using the Spearman correlation, only one significant correlation was found which is difficult to explain: the frequency of watching the newscast correlated significantly and positively with the lexical ambiguity category (Spearman r=.29, *p*<.001). Therefore hypothesis 5c is rejected. Young adolescents, who regularly follow the news by reading the newspaper or watching the newscast, were clearly not more amused by the riddles than young adolescents who hardly follow the news. Apparently, the riddles dealt not with themes or knowledge for which it was necessary to read the newspaper or watch the newscast to appreciate them more than one who is less informed about what is going on in the world.

Finally, the correlations between explanation completeness and riddle appreciation for the four riddle categories were computed to test hypothesis 7d. Only one significant correlation was found in the overall sample. The explanation completeness of the lexical riddles was significantly positively correlated with the appreciation for riddle category (Pearson r=.32, p<.001). These findings reject hypothesis 7d, which stated that riddle appreciation would be related to riddle comprehension and that young adolescents who show better riddle comprehension would show higher riddle comprehension. Although sometimes participants responded as follows: *"I do not get it, therefore I give a 1"* or *"A two, because I did not understand it"* these findings generally indicate that when young adolescents like a specific riddle, they do not automatically comprehend it or that when young adolescents dislike a specific riddle they will not always understand it. Apparently, young adolescents' riddle appreciation is based on other criteria than primarily comprehension. Investigating the explanations several motivations came across:

- Familiarity with the riddle: *"A 3, because I knew this one already";*
- Riddle theme: *"A 2, since I do not like jokes on football"* or *"I think it is a bad one because of the theme, so I give a 2"*;
- Originality of the riddle trick: *"A 2 as everyone can think up something like that"* or *"I think a 4, since it is good invented"*;
- Whether things or people are ridiculed: *"A 4, as they were not really ridiculed"* or *"I think that the Moroccans are ridiculed, so I give a 2";*
- Whether participants agree or disagreed with the tenor of the riddle; "*Yes, that is true, I do think that Bush is a bastard too, so I give a 1"* or *"But I do not think that Belgians are stupid, so I give a 2"*;
- Whether participants had to think: *"Well, I had to think very hard, so I give a 3"* or "I do not like to think hard, so I give a 2".

Whether the riddle was high or low appreciated because of, for example, people were ridiculed was very personal. Annick gave the mark 2 for the conceptual riddle on Moroccans (riddle 14) since she did not like it that the Moroccans were ridiculed, whereas Rachiel did not care that the Moroccans were ridiculed and thought actually it was really funny because he recognized something of what was intended by the riddle. Rachiel appreciated the riddle even with the mark 5.

5 Discussion & implications

In this chapter, the results of the present study are discussed and compared with those of the studies reviewed in Chapter 2 and then a number of conclusions are drawn. Finally, some pedagogical implications on the promotion of metalinguistic awareness in early adolescence and starting points for future research are presented.

5.1 General discussion

This study aimed at contributing to the understanding of metalinguistic awareness in early adolescence. Comprehension and appreciation of riddles requiring different levels of metalinguistic activity has proven to provide insight in metalinguistic awareness and cognitive development of children (Shultz & Pilon, 1973; Shultz & Horibe, 1974; Yalisove, 1978; Gleitman et al., 1978; Kurvers, 1981; Bakker, 2003). So far, little research effort has been devoted to the metalinguistic awareness of young adolescents. It was expected that riddle comprehension and riddle appreciation could also provide insight in the state of metalinguistic awareness of young adolescents. Therefore, in this study, the metalinguistic awareness in early adolescence was studied by investigating riddle comprehension and riddle appreciation. As metalinguistic awareness is expected to increase in early adolescence but differently for young adolescents from different school tracks, the study focused on young adolescents from 7th and 9th grade attending the vocational or the pre-academic school track. Although only a tip of the iceberg of the metalinguistic awareness of young adolescents has been tested, this study gives a clear indication of the differences in metalinguistic awareness between young adolescents attending different grades and school tracks.

As riddles dealing with different type of linguistic ambiguities revealed differences in metalinguistic awareness of children in the past, it was expected that the riddles also would result in different levels of riddle comprehension by young adolescents, and as such would be good measures for revealing different levels of metalinguistic awareness. Results of this study show indeed that riddle comprehension of young adolescents is related to the metalinguistic activity that is involved in riddles. The conceptual riddles and the lexical ambiguity riddles which require no or little complex metalinguistic activity are better explained and comprehended than the meaning-form and ambiguity riddles which require higher levels of metalinguistic activity. As such, it was interesting to investigate the comprehension and appreciation differences for the riddle categories between 7th and 9th graders and between vocational and pre-academic students since this could unravel who is most progressed in its metalinguistic development.

Curtis (2002) and Van Gelderen et al. (2007) predict that linguistic and cognitive skills develop during early adolescence but predict no similar development for young adolescents attending different school tracks. This is exactly what has been found in this study. In 7th grade, pre-academic students showed better riddle comprehension for the lexical ambiguity and meaning-form ambiguity riddles than vocational students. In 9th grade, pre-academic students show even for all riddle categories better riddle

comprehension than vocational students. This indicates that pre-academic students have better metalinguistic awareness compared to vocational students, and that the differences increase when higher grades are attended. This observation is confirmed when the differences in riddle comprehension are compared between 7th and 9th grade. With regard to metalinguistic development, it was revealed that in general, 9th graders show better riddle comprehension than 7th graders. This finding may be interpreted as evidence for the increased metalinguistic awareness during early adolescence. Regrettably, this conclusion does not hold when riddle comprehension of vocational and pre-academic 7th graders is compared to that of vocational and pre-academic 9th graders. Then, it appears that pre-academic students in 9th grade do show better riddle comprehension than pre-academic students in 7th grade, but that vocational 9th graders on the contrary, do not show better riddle comprehension compared to their peer-students in 7th grade. These findings indicate an increase of metalinguistic awareness for pre-academic students, but at the same time a stagnation of metalinguistic development for vocational students. It is interesting that growth in metalinguistic awareness results in the largest comprehension gain for the riddle categories that require the most complex metalinguistic activity: the meaning-form ambiguity and sentence ambiguity riddles. The findings for the pre-academic students are in line with the expectations and not worrisome. The findings for the vocational students are actually to worry about because particularly these students need to catch up in view of the arrears in literacy development that has been ascertained by among others Elley (1992), OECD (2001), Dagevos et al. (2003), Hacquebord (2004) and Educational Quality and Accountability Office (2005).

In search of predictors of the differences, particularly the type of knowledge young adolescents use to comprehend and explain riddles and their vocabulary size turned out to be determining for the degree of riddle comprehension. Young adolescents who next to world knowledge, use knowledge on the functioning and characteristics of language to explain the linguistic riddles were significantly more successful in linguistic riddle comprehension than young adolescents who only use their knowledge of the world. Furthermore, young adolescents who know more words are better in riddle comprehension than young adolescents who know fewer words. Although it was expected that frequent reading and a decent knowledge of what is going on in the world would promote riddle comprehension, this was not confirmed by the results of the study. Apparently, these factors did not contribute to a better or worse riddle understanding.

As the type of knowledge young adolescents used for riddle comprehension had such a large effect on riddle comprehension, it was investigated which type of knowledge young adolescents of different grades and school tracks used for riddle comprehension. This way it was tried to unravel which factors contribute to the knowledge that young adolescent use for riddle comprehension and thus which factors contribute to the variance in riddle comprehension and metalinguistic awareness. Because of the high correlations between riddle comprehension and explanation orientation it is not surprising that comparable differences in use of correct knowledge for riddle explanation are found as were found for riddle comprehension. As such, for the riddles that were comprehended the best, the conceptual riddles, also most of the times the correct knowledge was used for explanation. In addition, for the riddles that were comprehended the least, the sentence ambiguity riddles, also the least number of times the

correct knowledge was used to explain these riddles. Furthermore, it was found for explanation orientation as for riddle comprehension, that pre-academic students used more often the correct knowledge than vocational students did. It was also found that pre-academic 9th graders compared to pre-academic 7th graders used more often the correct knowledge for riddle explanation, while vocational students demonstrated no differences between 7th and 9th grade.

In search of predictors for the differences in knowledge that young adolescents use for riddle comprehension, three significant predictors were revealed: school track, reading vocabulary and grade. School track turned out to contribute most to the variance in the knowledge young adolescents use for riddle comprehension and thus for the degree of riddle comprehension, followed by reading vocabulary size and grade. As riddle comprehension is used as operationalization of metalinguistic awareness, it can be stated that school track, reading vocabulary and grade also determine the extent of metalinguistic awareness in early adolescence. That these predictors are revealed is actually not that surprising as higher levels of education and higher grades require according to Simons (1995) better academic skills including better linguistic competences and better control of metacognitive knowledge and skills. In this respect, it was not found by chance that pre-academic students 9th graders knew more words compared to their 7th grade-peer students, whereas vocational 7th and 9th graders knew approximately the same number of words.

In general, one might expect that the higher levels of education young adolescents attend, the larger vocabularies they possess and the higher grades they attend, the better their metalinguistic awareness will be developed. Fortunately, the largest part of the findings on metalinguistic awareness and its development confirm what one actually hopes to find. It would have even been more worrisome when also for pre-academic students no improvement in riddle comprehension was measured or that pre-academic students would score similar in riddle comprehension as the vocational students.

After riddle comprehension was examined, also riddle appreciation was investigated because Zigler et al. (1966) and McGhee (1971) consider levels of appreciation as good indicators for one's current levels of intelligence and metalinguistic awareness. Zigler et al. and McGhee argue that what one finds amusing is dependent on one's intellectual growth and that jokes, therefore, should be based on principles that are just beyond people's current intellectual level so that one is challenged and thus amused. This reasoning predicts that when riddles would be highly appreciated, they would fit to one's cognitive and metalinguistic level as people would be challenged and, therefore, amused. In addition, when riddles would be appreciated lowly, the riddles would be too difficult or too easy: either because one's cognition and metalinguistic levels are still too low, or because people's cognition and metalinguistic capacities have overgrown the riddles to be still challenging and amusing enough. Moreover, the reasoning of Zigler et al. and McGhee predicts that riddles lose popularity when children get older and attend higher levels of education as a result of their assumed intellectual and metalinguistic development.

Results of this study show that the different riddle categories were appreciated differently, by which the appreciation sequence showed large similarity with the riddle comprehension sequence (conceptual >

lexical ambiguity > meaning-form ambiguity > sentence ambiguity). The conceptual riddles which were best comprehended, were also most appreciated, and the riddles which were least comprehended were also least appreciated. Only, the meaning-form ambiguity riddles were higher appreciated than one might have expected on the basis of the level of comprehension of this riddle category. The findings of this similarity suggest a strong relationship between riddle comprehension and riddle appreciation. Therefore, it was interesting to find out which similarities could be revealed when analysing more specifically for grade and school track.

Subsequent analyses revealed that vocational and pre-academic students liked the different riddle categories equally. From these findings it may thus not be concluded that vocational and pre-academic students have different levels of intelligence and metalinguistic awareness, whereas this actually is concluded based on the measures for riddle comprehension. However, from the analyses for riddle appreciation in relation to grade, comparable conclusions may be drawn as from the results on riddle comprehension. In general, a decrease in riddle appreciation was measured between 9th and 7th graders, which might indicate that 9th graders have better metalinguistic awareness and intellectual skills by which they might be less cognitively challenged so that their riddle appreciation decreases. After all, the results on riddle comprehension revealed that 9th compared to 7th graders showed better riddle comprehension which indicates an increase of metalinguistic awareness. Furthermore, a significant decrease in riddle appreciation was measured between pre-academic 9th and 7th graders. Also, this finding may be interpreted as a signal that the pre-academic 9th graders were cognitively less challenged as a result of their increased metalinguistic awareness and intellectual skills. Hence, the results on riddle comprehension revealed that pre-academic 9th graders compared to pre-academic 7th graders showed better riddle comprehension.

As the preceding comparisons between riddle comprehension and riddle appreciation resulted in several interesting similarities, the correlation between riddle comprehension and riddle appreciation were calculated. This resulted remarkably in only one significant correlation. Therefore, it should be concluded that riddle comprehension is in spite of the appealing similarities not that determining for riddle comprehension as one might think at first sight. These observations agree with the findings of Prentice & Fathman (1975) and Bakker (2003) who also found no significant correlations between riddle appreciation and riddle comprehension. However, the observations do not agree with the findings of Kurvers (1981), who did find a significant positive correlation between riddle comprehension and riddle appreciation. Also linguistic competences, reading behaviour and world knowledge did not influence the riddle appreciation of young adolescents. This means that when young adolescents like a specific riddle this it does not automatically indicates that they have better metalinguistic awareness, better linguistic competences or more knowledge about the world than young adolescents who liked the riddle less. Apparently, the relation between riddle appreciation and riddle comprehension is somewhat more complicated for young adolescents than just a matter of applying the reasoning of Zigler et al. and McGhee that what one finds amusing is a good indicator for what one is cognitively and metalinguistically capable of. Young adolescents' riddle appreciation is clearly based on other criteria than primarily comprehension. Investigating the explanations for appreciation motivation factors, such

as: familiarity with the riddle; riddle theme; originality of the riddle trick; whether things or people are ridiculed; whether participants agreed or disagreed with the tenor of the riddle and whether participants had to think, turned out that there are other important factors in young adolescents' riddle appreciation.

When the results of this study are compared to the results of this kind of studies with children in primary school, several interesting similarities and additional knowledge are revealed. Like it was found for children that riddle comprehension and comprehension of linguistic ambiguities increases with age and that it varies for the type of joke technique or linguistic ambiguity that is involved, this was also found for young adolescents (Shultz & Pilon, 1973; Shultz & Horibe, 1974; Yalisove, 1978; Gleitman et al., 1978; Kurvers, 1981; Bakker, 2003). The age effect of children is explained by the cognitive development that children experience when they get older. For young adolescents the same argument can be used, as young adolescents' cognitive skills, including metalinguistic skills also develop during early adolescence. The effect of academic skills on riddle comprehension was not analyzed for children, as no clear and practical selection criteria are available in primary education to distinguish between children who have better and weaker academic skills. In secondary education, these criteria are available in the form of school track, as one might assume that students of the pre-academic school track have better academic skills than students of the vocational school track. A substantial effect of school track on riddle comprehension and metalinguistic awareness was revealed for young adolescents, while this effect is not exactly reported in the studies on children. Furthermore, this study revealed for young adolescents like the studies of Kurvers (1981) and Bakker (2003) revealed for children, that linguistic competences are related to riddle comprehension and thus related to metalinguistic awareness. Just like Bakker (2003), this study showed that vocabulary was even more explanatory for riddle comprehension than age in Bakker's study or grade in this study.

When the riddle comprehension ranking and the riddle appreciation ranking of young adolescents are compared to those of children, it is revealed that both rankings do not change when children become older. Still, the conceptual riddles are better comprehended and by far more popular than the linguistic riddles and still the lexical riddles are the most popular and best comprehended of the linguistic riddles. Also, the fact that the sentence ambiguity riddles are the least popular and least comprehended does not change when children get older. These findings indicate that the current level of young adolescents' intelligence and metalinguistic awareness is increasing but has not overgrown the levels of metalinguistic awareness that the riddles require yet. No maximum scores for riddle comprehension were obtained, although for the conceptual riddles very high comprehension scores were obtained. The pre-academic 9th graders even obtained a maximum score for the total number of times they used the correct knowledge for explanation of the conceptual riddles. If maximum scores would have been obtained to a great extent, the riddles could not have functioned as reliable operationalizations for the measurement of metalinguistic awareness of young adolescents. Investigation of metalinguistic awareness by using riddles is therefore, perhaps less appropriate when children are older than 16 years of age.

Studies of Shultz & Pilon (1973), Shultz & Horibe (1974) and Gleitman et al. (1978) found that lexical ambiguity riddles showed a linear increase in comprehension up to the age of 15. Furthermore, they found that riddles dealing with syntactic ambiguities were comprehended from the age of 12 years old. The findings of this study confirm both findings. Also in this study, young adolescents showed an increase in comprehension of the lexical ambiguity riddles between 7th and 9th grade. Next, the results of this study confirm that young adolescents indeed are able to comprehend the syntactic ambiguities as the sentence ambiguity riddles are in general fairly comprehended. However, the findings also indicate that sentence ambiguity riddles are still the most difficult as they are significantly less comprehended than the other linguistic riddles and the conceptual riddles.

In conclusion, the study revealed that pre-academic students have better metalinguistic awareness than vocational students and that the metalinguistic awareness of pre-academic students increases in early adolescence, while the development of metalinguistic awareness of vocational students rather stagnates in early adolescence. The variance in metalinguistic awareness can be explained by the school track (academic skills) and grade (age) young adolescent attend and by the reading vocabulary that young adolescents possess in early adolescence.

With the help of these findings the fourth stage of Gombert's model on metalinguistic awareness discussed in section 2.1.3 can be added (Gombert, 1992). The fourth stage in Gombert's model on metalinguistic awareness deals with the automation of metaprocesses and is considered to be the final stage in the active application of metacognitive strategies. While Gombert indicated for the other three stages of the model a time span, no time span was indicated for the fourth stage. As this study reveals that young adolescents' metalinguistic awareness in general increases in early adolescence, it may be added that the automation of metaprocesses may continue to at least the age of 16 years old. However, it should be remarked that the automation of metaprocesses does not continue for all types of young adolescents to the same age. School track and linguistic competences should be mentioned as predictive factors for the age until when young adolescent's metalinguistic awareness continues.

Furthermore, McGhee's model on humour development discussed in section 2.2.1 can be added on the basis of the results of this study (McGhee, 1971b; 1974). McGhee's present model on humour development has four stages by which the fourth stage is characterized by the child's ability to understand double meanings that words and sentence may have. According to McGhee, the first steps towards mature humour occur around the age of 6 to 7 years old. The results of this study confirmed the assumption of Menyuk and Brisk (2005) that also in early adolescence the ability to cope with different kinds of ambiguities is still under development. Thus even in early adolescence, young adolescents are not yet completely proficient in dealing with double meanings and figurative language use. Furthermore, substantial differences were measured for young adolescents attending different school tracks and grades. Therefore, it is suggested to extend the time span of McGhee's fourth stage from 6 to 7 years to the age of 16. Another, and probably better option would be to add a fifth stage to McGhee's model on humour development by which a clear distinction is made between the first abilities to recognize and understand double meanings in the fourth stage (approximately 6 or 7 years of age)

and between the automation of coping with linguistic ambiguities of different complexity in the fifth stage (approximately 8 to 16 years of age).
Because of the strong relationship between metalinguistic skills and literacy skills, this study has not only contributed to the understanding of metalinguistic awareness in early adolescence but also to the understanding of adolescent literacy. As cited in the introduction, for good reading and writing one needs good language skills, metacognitive knowledge and a decent metalinguistic awareness. Unsuccessful literacy development may be caused by insufficient development of linguistic skills, metacognitive knowledge and metalinguistic awareness. This study indicates that particularly the vocational students run the risk of unsuccessful literacy development and related unsuccessful societal careers as a result of stagnation of metalinguistic development and vocabulary growth.

From this study, the following main conclusion can be drawn:

- (Verbal) Riddles are appropriate and appealing operationalizations of metacognitive and metalinguistic awareness of young adolescents;
- Metalinguistic awareness develops differently for different types of young adolescents in early adolescence;
- The metalinguistic development of vocational students stagnates in early adolescence;
- The metalinguistic development of pre-academic students continues in early adolescence;
- Pre-academic students are metalinguistically more progressed than vocational students' in early adolescence;
- Variance in metalinguistic awareness and its development in beginning adolescence can be explained by the school track (academic skills) and grade (age) young adolescents attend and by the reading vocabulary that young adolescents possess.

5.2 Pedagogical implications

The results of the present study have shown that the growth of vocabulary and development of metalinguistic awareness of vocational students stagnate in early adolescence. The literature review in Chapter 2 indicated that students who possess large vocabularies and good metacognitive and metalinguistic knowledge and skills, are better lettered and as such run smaller risks of unsuccessful school and societal careers. In view of the existing literacy arrears that have been ascertained in studies by Elley (1992), OECD (2001), Dagevos et al. (2003), Hacquebord (2004) and this study, the importance of vocabulary teaching and attention for metacognitive and metalinguistic awareness in secondary education is beyond questioning.

Vocabulary teaching in secondary education has already been advocated by researchers and several methods directed at expansion of vocabulary in secondary education are developed now. For example, the *Posterproject voor het voorgezet onderwijs* which has been directed at all types of students in secondary education and the method *Dubbelslag* which has been developed for vocational students in particular. For the most part, these kinds of methods are specifically directed at the expansion of school vocabulary and professional language. The focus is on school vocabulary and professional language and

not on basic vocabulary, as students in secondary education need to know words with which they can comprehend school books, instructions, explanations of teachers and which they can use for cooperation with peer-students, to formulate their opinion and to write texts. To be able to do this, some vocabulary is needed. Difficult words are the core of subject matter after all. Expansion of school vocabulary and professional language needs to be done in the classroom, as it is not guaranteed that all students will encounter these specific words in the out-of-school context. When schools have no means to invest in special methods for vocabulary expansion, texts that students encounter in daily courses can perfectly be used (content-based learning e.g. Bygate, Skehan & Swain, 2001). As such, different text genres and different vocabulary and structural compositions will come across. Both the specific vocabulary that may cause difficulties for some students and the variations in the structure of the text can be discussed. The meaning of the difficult words can be looked up in dictionaries and, also, discussed in the classroom. This should also include discussion about the phonological composition of words, and what the sentential context of words tells us about the meaning. Vocabulary knowledge is crucial to the understanding of both spoken and written language, and that knowledge should be expanded by adding words that are causing difficulties.

The improvement of metalinguistic awareness in secondary education has not much advocated and as a consequence no concrete approaches to tackle this problem have been developed yet. However, Menyuk & Brisk (2005) have proposed some pedagogical suggestions that are worthwhile to discuss in this respect. As noted in Chapter 2, users of language use their metalinguistic awareness for diverse linguistic activities. One can think of: scoring 'slips of the tongue', noticing of atypical form of language acts or dialect, making and understanding puns or word jokes, resolving linguistic ambiguities, judging grammaticality or appropriateness and deciding on deeper meanings or intentions from word choices. The core of these linguistic activities is in the awareness of the structural possibilities of language. To improve metalinguistic awareness, it is therefore important to learn more about the structure of language. Thus, according to Menyuk & Brisk (2005) teaching should direct on 1) learning to comprehend and use figurative language, 2) further development of some structures that provide additional opportunities for sentence combination and convey different meanings, and 3) further morpho-phonological or morpho-syntactic development. All of these developments promote language competences and play a role in making these language abilities more competent. Development in all these areas should be assisted by asking students to think and talk about appealing examples in each of these areas. In view of the pleasure with which the young adolescents have participated in this study and the characteristics of riddles, riddles may be a very interesting tool to teach young adolescents more about the structure of language. Verbal riddles are appealing because they offer an opportunity to experiment with language in unexpected or unusual ways. Through riddles, young adolescents gather and interpret language, make inferences and draw conclusions. When provided with the riddle solution, they interpret this new information, construct meanings to clarify and extend knowledge and gain insight in the essence of the language play as well as in their own learning process. Through interpretation and discussion of these forms of language play, students can improve their listening, speaking, reading and writing skills. Thus, riddles may bring a laugh to young adolescents while improving the opportunities to facilitate language learning across the curriculum. By supporting a

natural curiosity with words, providing challenging experiences, and motivating through the power of humour, riddles may make learning and using language fun for all.

5.3 Implications for future research

Like in every study, there are some limitations to this study. The factors school track and grade were revealed as significant predictors for metalinguistic awareness, which implies that students attending different school tracks and grades may possess other levels of knowledge and skills. This study already revealed that vocabulary is one of the aspects in which students from different school tracks and grades differ. In addition, this study revealed that vocabulary has a strong relationship with metalinguistic awareness. It is very probable that other language and academic skills would also have contributed to the variance in metalinguistic awareness. Kurvers (1981), for instance, found that the level of reading proficiency was related to the metalinguistic abilities of children. It is very likely that when this factor would have been included in this study, it would have contributed to explaining the variance in metalinguistic awareness of young adolescents. To test young adolescents' basic reading skills, the KLEPEL method of Van Den Bosch et al. (1994) can be used.

Additionally, it would have been useful to test the young adolescents on their knowledge on grammar and syntax, as the riddles required this kind of knowledge and may thus have influenced the results on metalinguistic awareness. To test Dutch grammar, the Paper-and-pencil multiple-choice test used by Van Gelderen et al. (2004) can be used. In this respect, the same might be true for the oral and listening proficiency of the young adolescents. As the young adolescents had to listen to the riddles and next were asked to orally explain the riddles to the experimenter, these factors may have biased the results on metalinguistic awareness. Perhaps some young adolescents might demonstrate better linguistic awareness as the riddles would have been presented in written form, while others may have been advantaged because they have such good listening proficiency. In addition, students who are orally more competent might have given better explanations, although this does not have to mean that students who are orally less competent had worse riddle comprehension. There is a chance that orally less competent students did understand the riddles but were simply not able to put that adequately into words. To test young adolescents' listening span, one could use Christoffels' adaptation of span tests originally developed by Daneman & Carpenter (1980) (Christoffels et al., 2003). Finally, gender might have biased the results as the literature on humour views gender still as important predictor for riddle appreciation. Perhaps, boys and girls might prefer and use different types of humour, by which they differ in familiarity with joking riddles and riddle-telling behaviour and as such differ in the ability to comprehend and explain them. Unfortunately, this study could not determine the effect of gender because of the unequal distribution of boys and girls within the sample. Therefore, I would like to suggest in view of future research, to take the gender effect and the other mentioned effects into serious consideration.

To extend the knowledge on metalinguistic awareness and literacy in early adolescence, it may also be interesting to investigate metalinguistic awareness in close relation to other metacognitive skills, such as

meta-memory and meta-learning. Meta-memory concerns with knowledge about how memory works and the ability to control one's own memory. The more one knows about how memory works, the more likely people are to benefit from memory skills, including metalinguistic skills. In line with meta-memory skills, it would also be useful to gain more insight in the knowledge that young adolescents have on reading and writing strategies. For this, retroflective interviews can be conducted in which students are asked to reflect on reading and writing tasks which they have performed. This way, student's reasoning when reading and writing is revealed which may indicate when and where things go wrong and should be adjusted.

Finally, I would like to suggest a study into the implementation of instructions to improve awareness of the structure of language in secondary education. For this, first an inventory has to be made of what is currently taught in view of awareness of language structure in both language courses and other courses. Based on the inventory, it can be determined whether existing instructions have to be adapted or that new instructions have to be developed and implemented. In this respect, one might experiment with riddles and other examples of figurative language such as rap lyrics or modern poetry as tools for instruction.

In conclusion, the present study provides an interesting but small contribution to the understanding of metalinguistic awareness in early adolescence. Further research using additional tests for assessing more background data is needed to supplement the data obtained in the present study. Despite a tip of the iceberg of metalinguistic awareness in early adolescence is unriddled, there is much left to be investigated.

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Appendices

Appendix 1a The riddle categories

A. Meaning-Form ambiguity	
1	Q: Wat staat er op een Turkse botsauto? A: Ram-me-dan.
2	Q: Wat heeft Shakira voor en hebben de Pussy Cat Dolls achter? A: De S.
3	Q: Hoe noem je een lift voor een dikkerd? A: Een spektakel.
4	Q: Wat is het tegenoverstelde van Marokkaan? A: Pabroekuit.
Example 1	Q: Wat is een Turkse vrouw op een fiets? A: Een snorfiets

B. Lexical ambiguity	
5	Q: Waarom hebben ze in België ondergrondse scholen? A: Daar kunnen ze dieper nadenken.
6	Q: Wat is het verschil tussen jou en een brief? A: Een brief is geschreven en jij bent getikt.
7	Q: Wat doe je als je schoonmoeder uitgaat? A: Haar opnieuw aansteken.
8	Q: Wat is het verschil tussen een Belg en een foto? A: Een foto is wel ontwikkeld.

C. Sentence ambiguity	
9	Q: Waarom gaat een dom blondje op vrijdag door het raam naar buiten? A: Omdat het weekend voor de deur staat.
10	Q: Waarom loopt een Belg op maandag naast zijn fiets? A: Omdat het weekend erop zit.
11	Q: Kunnen Surinamers harder roepen dan hun gettoblasters? A: Natuurlijk, want gettoblasters kunnen helemaal niet roepen.
12	Q: Hoe voorkom je dat bejaarden gaan ruiken? A: Door hun neus af te snijden.

D. Conceptual

13 Q: Wat is het toppunt van gemengde gevoelens?

A: Je schoonmoeder in je gloednieuwe BMW het ravijn in zien rijden.

14 Q: Wat is het vriendelijkste volk ter wereld?

A: Marokkanen. Ze komen met tien man om je heen staan en vragen of je problemen hebt.

15 Q: Wat is de overeenkomst tussen Feyenoord en Sinterklaas?

A: Ze zijn allebei rood met wit en niemand gelooft er meer in.

16 Q: Wat is het verschil tussen een strafschop van het Nederlands elftal en een biertje?

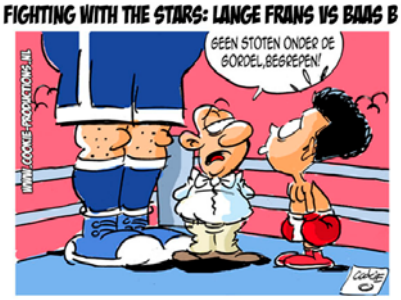
A: Ze zijn allebei rood met wit en niemand gelooft er meer in.

17

18

19

20



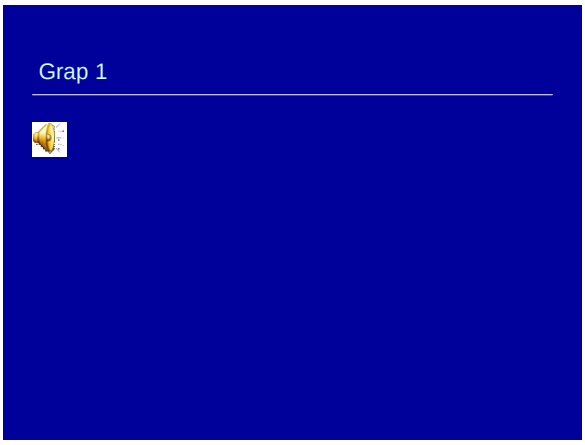
Example 2 Q: Wat heeft 64 ogen, 64 wielen en 3 tanden?

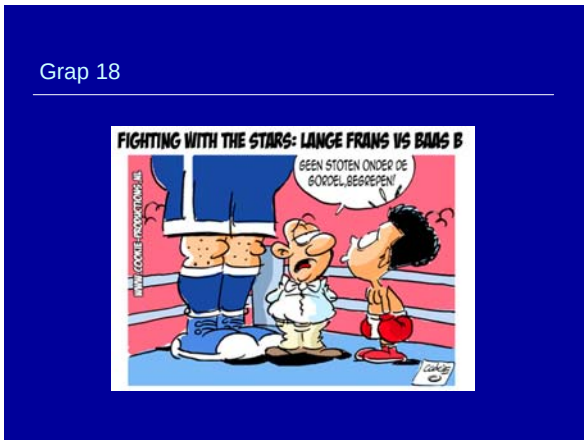
A: Een polonaise in het bejaardenhuis.

Appendix 1b Riddle sequence for both Riddle test versions

Version 1		Version 2	
Example 1	Joke 10 – 3	Example 1	Joke 10 – 14
Example 2	Joke 11 – 14	Example 2	Joke 11 – 3
Joke 1 – 5	Joke 12 – 11	Joke 1 – 16	Joke 12 – 10
Joke 2 – 9	Joke 13 – 19	Joke 2 – 12	Joke 13 – 18
Joke 3 – 17	Joke 14 – 7	Joke 3 – 20	Joke 14 – 2
Joke 4 – 1	Joke 15 – 15	Joke 4 – 8	Joke 15 – 6
Joke 5 – 13	Joke 16 – 4	Joke 5 – 4	Joke 16 – 13
Joke 6 – 6	Joke 17 – 8	Joke 6 – 15	Joke 17 – 1
Joke 7 – 2	Joke 18 – 20	Joke 7 – 7	Joke 18 – 17
Joke 8 – 18	Joke 19 – 12	Joke 8 – 19	Joke 19 – 9
Joke 9 – 10	Joke 20 – 16	Joke 9 – 11	Joke 20 – 5

Appendix 1c Screenshots of digital Riddle test





Appendix 2 The Reading Vocabulary Test

Woordentoets

In dit boekje staan veel zinnen. In die zinnen staat een streep onder één of meer woorden. Jij moet aangeven wat daar de betekenis van is. Je kunt steeds uit vier antwoorden kiezen. Eén van de vier antwoorden betekent precies hetzelfde als de woorden die onderstreept zijn. Zet een rondje om de letter (A, B, C of D) die voor het goede antwoord staat.

Voorbeeld 1

Dat dier heeft last van zijn hoef.

A. deel van de borst
B. deel van de kop
C. deel van de rug
D. deel van de voet

Een hoef is een deel van de voet. Je zet dus een rondje om de letter D.

Voorbeeld 2

Ik denk dat bij de fanfare ga.

A. vereniging van mensen die aan een bepaalde sport doen
B. vereniging van mensen die een bepaald soort muziek maken
C. vereniging van mensen die in dezelfde buurt wonen
D. vereniging van mensen die hetzelfde geloof hebben

Een fanfare is een vereniging van mensen die een bepaald soort muziek maken. Het goede antwoord is dus B. Zet dus een rondje om de letter B.

Steeds is maar één van de vier antwoorden het beste.
Als je denkt dat je je vergist hebt, zet je een kruis door je rondje. Daarna zet je een rondje om de letter voor het beste antwoord.

Veel succes!

1. Mag ik jouw kam even lenen?

A. ding waarmee je het eten snijdt
B. ding waarmee je je haren netjes maakt
C. ding waarmee je rekent
D. ding waarmee je schrijft

2. Hij is duizelig.

A. Alles draait in zijn hoofd.
B. Hij is erg moe.
C. Hij is heel rijk.
D. Hij is in Duitsland geboren.

3. Wat een mooi baldakijn!

A. soort dak
B. soort jurk
C. soort pop
D. soort wagen

4. Ik volg een cursus wijsbegeerte.

A. een manier van koken
B. een manier van muziek maken
C. een soort sport
D. een soort wetenschap

5. Moet hij <u>boeten</u>?

A. geld krijgen voor wat hij gedaan heeft
B. gezien worden als hij iets doet dat niet mag
C. straf krijgen voor wat hij gedaan heeft
D. vertellen wat hij gedaan heeft

6. Zij is een <u>dromerig</u> meisje.

A. Zij bestaat niet echt.
B. Zij gaat vaak naar de film.
C. Zij is vaak met haar gedachten ergens anders.
D. Zij vindt zichzelf erg mooi.

7. Kijk, wat een mooi <u>vest</u>!

A. een soort broek
B. een soort hoed
C. een soort schoen
D. een soort trui

8. Haar kleding is <u>buitenissig</u>.

A. heel eigenaardig
B. heel gewoon
C. heel lelijk
D. heel mooi

9. Die mensen hebben een <u>bok</u> in hun tuin.

A. soort boom
B. soort brievenbus
C. soort dier
D. soort feest

10. Hij werkt bij een <u>uitgeverij</u>.

A. bedrijf dat boeken laat drukken
B. gebouw waar je dingen kunt kopen
C. instelling die arme mensen helpt
D. kantoor waar je geldzaken doet

11. Na die gebeurtenis kon ik hem niet <u>bedaren</u>.

A. naar een andere plek brengen
B. proberen beter te maken
C. rustig maken
D. wakker maken

12. Het <u>koren</u> is op.

A. de rijst
B. een soort brood
C. een soort graan
D. het goud

13. Hij is een <u>rakker</u>.

A. Hij doet vaak dingen die niet mogen.
B. Hij houdt van rennen.
C. Hij praat altijd heel erg snel en erg hard.
D. Hij werkt in de politiek.

14. Die plant <u>verstikt</u> de mooie boom.

A. beschermt
B. doodt
C. versterkt
D. voedt

15. Wil je mijn zaak <u>bepleiten</u>?

A. met woorden beginnen
B. met woorden helpen
C. met woorden stoppen
D. met woorden vertellen

16. De buren <u>gluren</u> altijd.

A. kijken naar binnen zonder dat wij het merken
B. komen binnen terwijl we geen afspraak hadden
C. lopen door de tuin
D. maken heel veel geluid

17. Zij roept haar <u>ondergeschikten</u> bij zich.

A. benedenburen
B. kinderen
C. vriendinnen
D. werknemers

18. Dat zou ik anders <u>inschatten</u>.

A. beoordelen
B. doen
C. opschrijven
D. zeggen

19. Ik gebruik graag een <u>potlood</u>.

A. een brede stok om rechte lijnen te tekenen
B. een houten stokje waarmee je kunt tekenen
C. een leeg boekje met lijntjes om in te schrijven
D. een voorwerp waarmee je kunt schrijven

20. Hij heeft pijn in zijn <u>hiel</u>.

A. achterkant van de voet
B. bovenste deel van het hoofd
C. onderste deel van de rug
D. zijkant van de knie

21. Wat een lelijke <u>hoest</u> heb jij!

A. ding dat je hoofd beschermt
B. geluid dat je met je keel maakt als je verkouden bent
C. je gedrag in het openbaar
D. manier waarop je je haar draagt

22. Zij hield een mooie <u>toespraak</u>.

A. Zij gaf een mooie voorstelling.
B. Zij had een mooie hoed op.
C. Zij sprak mooi tegen het publiek.
D. Zij zong een mooi lied.

23. De mannen <u>beroven</u> hem.

A. brengen iets van hem terug
B. maken iets stuk van hem
C. stelen iets van hem
D. verbranden iets van hem

24. Hij kon het niet <u>verhelen</u>.

A. Hij kon er niets aan veranderen.
B. Hij kon er niet over zwijgen.
C. Hij kon het niet verkopen.
D. Het was zijn schuld niet.

25. Hij geeft al zijn tijd aan <u>worstelen</u>.

A. Hij doet een soort sport.
B. Hij vindt rekenen leuk.
C. Hij werkt altijd in zijn tuin.
D. Hij wil slager worden.

26. Hij heeft een goede <u>oogst</u>.

A. boerderij
B. ding waarmee je kunt zien
C. groep dieren
D. producten die een land opbrengt

27. Wij moeten ons huiswerk <u>afmaken</u>.

A. helemaal maken
B. kijken of het klopt
C. opnieuw maken
D. samen doen

28. Die man heeft mij mijn geld <u>ontnomen</u>.

A. Die man heeft geld van mij geleend.
B. Die man heeft mij geld gegeven.
C. Die man heeft mijn geld afgepakt.
D. Ik heb die man geld gegeven.

29. De <u>teller</u> liep hoog op.

A. berg
B. meter
C. rekening
D. ruzie

30. Hiermee <u>beëindigen</u> we de vergadering.

A. beginnen
B. stoppen
C. vergeten
D. verrassen

31. Laten we het maar eens <u>afwegen</u>.

A. Laten we het maar eens goed schoonmaken.
B. Laten we maar eens precies kijken hoe diep het is.
C. Laten we maar eens precies kijken hoe groot het is.
D. Laten we maar eens precies kijken hoe zwaar het is.

32. Ik vind <u>bloedworst</u> vies!

A. een soort vis
B. een soort vlees
C. een soort spel
D. een soort sport

33. Ik heb nog nooit een staaf goud gezien.

A. berg
B. ding met een lange vorm
C. ding met een vierkante vorm
D. kilo

34. Hij zag asgrauw.

A. Hij had grijs haar.
B. Hij kon niet goed zien.
C. Hij zag het vuur uitgaan.
D. Zijn gezicht had geen kleur.

35. Het gaat allengs beter met haar.

A. helemaal niet
B. natuurlijk
C. sinds lange tijd
D. steeds iets

36. Dat is een knoestige boom.

A. een boom met een bepaalde leeftijd
B. een boom met een bepaald soort bladeren
C. een boom met een bepaald soort vruchten
D. een boom met een bepaalde vorm

37. Mijn vriend is wantrouwig.

A. heeft weinig vertrouwen
B. is altijd ontrouw
C. wil graag trouwen
D. zorgt goed voor mij

38. Hij kocht onroerend goed.

A. beelden en schilderijen
B. mooie boeken
C. prachtige kleren
D. stukken grond en gebouwen

39. Mijn buurman klaagt steevast.

A. bijna nooit
B. de hele tijd
C. heel hard
D. in zijn huis

40. Ik kan de schaar niet vinden.

A. ding waarmee je de ramen schoonmaakt
B. ding waarmee je een fles openmaakt
C. ding waarmee je iets in twee delen deelt
D. ding waarmee je kaas snijdt

41. Tijdens het spitsuur is het druk.

A. begin van de vakantie
B. einde van de wedstrijd
C. tijd waarop de dokter mensen ontvangt
D. tijd waarop mensen van en naar hun werk gaan

42. Mijn spijkerbroeken slijten snel.

A. geen makkelijk dicht
B. raken snel zoek
C. worden snel dunner
D. zitten erg strak

43. Ik heb een voordelig pak gekocht.

A. duur pak
B. goedkoop pak
C. heel mooi pak
D. pak met een broek en een jas

44. Dat kan ik voorshands niet zeggen.

A. door omstandigheden
B. mogelijk
C. voorlopig
D. wegens duidelijke redenen

45. In de westers wereld zijn er veel levensmiddelen.

A. dingen die je eet
B. dingen om je huis warm te maken
C. dingen tegen ziektes
D. dingen waarmee je schoonmaakt

46. Haar handen waren verkleumd.

A. koud
B. hard
C. warm
D. zacht

47. Het meisje houdt van neuriën.

A. erg verliefd zijn
B. kijken zonder iets te zoeken
C. zachtjes fluiten
D. zingen zonder woorden

48. Ik heb eindelijk wat meer armslag.

A. geld en tijd om dingen te doen
B. hoop dat ik voor mijn examen slaag
C. kracht om te vechten
D. zin om naar school te gaan

49. Hij ontzegt haar elk plezier.

A. Hij wil dat ze veel plezier heeft.
B. Hij zorgt ervoor dat ze geen plezier heeft.
C. Zij heeft veel plezier met hem.
D. Zij wil zonder hem geen plezier hebben.

50. Hij zorgt altijd voor een hoop narigheid.

A. gezelligheid
B. grapjes
C. problemen
D. verveling

DIT IS HET EINDE VAN DE TEST, DANK JE WEL!!

Participantnummer:

Tijdsduur:

Appendix 3 Questionnaire

Pariticipantnummer:				Opleiding:			
Leeftijd:				Leerjaar:			
Geslacht:							
In welk land ben je geboren?							
In welk land zijn je ouders geboren?							
Wat is je moedertaal?							
Welke taal spreek je thuis?							
Lees je vaak?	Helemaal nooit	1	2	3	4	5	Heel vaak
Hoe vaak lees je de krant?	Helemaal nooit	1	2	3	4	5	Heel vaak
Hoe vaak kijk je naar het journaal?	Helemaal nooit	1	2	3	4	5	Heel vaak
Wat lees je het liefst?	Boeken		Tijdschriften		Strips		Kranten

Appendix 4 Riddle appreciation score form for version 1

VERSIE: PARTICIPANTNUMMER:

BEGINTIJD: EINDTIJD:

	GRAP	WAARDERING				
1	V: Waarom hebben ze in België ondergrondse scholen? A: Daar kunnen ze dieper nadenken.	1	2	3	4	5
2	V: Waarom gaat een dom blondje op vrijdag door het raam naar buiten? A: Omdat het weekend voor de deur staat.	1	2	3	4	5
3	Bush	1	2	3	4	5
4	V: Wat staat er op een Turkse botsauto? A: Ram-me-dan.	1	2	3	4	5
5	V: Wat is het toppunt van gemengde gevoelens? A: Je schoonmoeder in je gloednieuwe BMW het ravijn in zien rijden.	1	2	3	4	5
6	V: Wat is het verschil tussen jou en een brief? A: Een brief is geschreven en jij bent getikt.	1	2	3	4	5
7	V: Wat heeft Shakira voor en hebben de Pussy Cat Dolls achter? A: De s.	1	2	3	4	5
8	Ali B	1	2	3	4	5
9	V: Waarom loopt een Belg op maandag naast zijn fiets? A: Omdat het weekend erop zit.	1	2	3	4	5

10	V: Hoe noem je een lift voor een dikkerd? A: Een spektakel.	1	2	3	4	5
11	V: Wat is het vriendelijkste volk ter wereld? A: Marokkanen. Ze komen met 10 man om je heen staan en vragen of je problemen hebt.	1	2	3	4	5
12	V: Kunnen Surinamers harder roepen dan hun gettoblaster? A: Natuurlijk, want gettoblasters kunnen helemaal niet roepen.	1	2	3	4	5
13	Prins Willem-Alexander en prinses Maxima	1	2	3	4	5
14	V: Wat doe je als je schoonmoeder uitgaat? A: Opnieuw aansteken.	1	2	3	4	5
15	V: Wat is de overeenkomst tussen Feyenoord en Sinterklaas? A: Ze zijn allebei rood met wit en niemand gelooft er meer in.	1	2	3	4	5
16	V: Wat is het tegenovergestelde van een Marokkaan? A: Een Pabroekuit.	1	2	3	4	5
17	V: Wat is het verschil tussen een Belg en een foto? A: Een foto is wel ontwikkeld.	1	2	3	4	5
18	Lange Frans en Baas B	1	2	3	4	5
19	V: Hoe zorg je ervoor dat bejaarden niet gaan ruiken? A: Door hun neus af te snijden.	1	2	3	4	5
20	V: Wat is het verschil tussen een strafschop van het Nederlands elftal en een biertje? A: Een biertje gaat er altijd in.	1	2	3	4	5

Appendix 5 Records of the Riddle test examination

In this appendix, a part of the Riddle test examination of Inge and Niels is presented. Of both participants the explanation and appreciation of the same 10 verbal riddles is written out. Since, most riddles are based on linguistic tricks that are typical for the Dutch language the riddles are not translated.

Legend		
RQ: Riddle Question	RA: Riddle Answer	C: cartoon

Record of conversation with Inge, which attended 9th grade of the vocational school track.

RQ: Wat is het verschil tussen een strafschop van het Nederlands elftal en een biertje?
RA: Een biertje gaat er altijd in.
"Penalties usually miss the goal, and one can always drink beers. Therefore, I give a 3."

RQ: Hoe voorkom je dat bejaarden gaan ruiken?
RA: Door hun neus eraf te snijden.
"Yes old people stink very much. And with 'ruiken' it is meant that they smell themselves. (Yes, you explained this very well. What do you think about this joke?) I give a 1. (You see, one may understand the joke, but that does not mean that it is also a funny joke) No, indeed."

RQ: Wat is het verschil tussen een Belg en een foto?
RA: Een foto is wel ontwikkeld.
"I do get this joke. Belgians are not developed, at least not completely developed. And pictures are developed. (Yes, exactly.) I give a 3."

RQ: Wat is het tegenovergestelde van een Marokkaan?
RA: Een pabroekuit.
"Pabroekuit? (To what can this word refer to?) I do not understand it. (ma-rok-aan, pa-broek-uit) Gee, I have to think about this deeply, and I am not very good at thinking deeply. So I give a 3."

RQ: Wat doe je als je schoonmoeder uitgaat?
RA: Haar opnieuw aansteken.
"Oh, I do get this joke. (Yes? Can you explain it to me?) Yes, because she is going-out. That's why you have to put her on fire. (Did you think that immediately?) No, I was thinking about going out. (Yes?) Or about going to a pub or something. (Yes, and what do you think about this joke?) I give this joke a 4. (Great, the first 4!)"

RQ: Kunnen Surinamers harder roepen dan hun gettoblasters?

RA: Natuurlijk, want gettoblasters kunnen helemaal niet roepen.

"(Do you know what gettoblasters are?) No. (Gettoblasters are big portable radios. So it is asked: Can Surinamese people shout louder than radios?) Ohh, and then the answer to this question is 'of course' as radios cannot shout. I think this joke is a 3 worth."

RQ: Hoe noem je een lift voor een dikkerd?

RA: Een spektakel

"I do not know the words. (An elevator for a fat man is called a 'spektakel', why do you think that?) I do not know. (Fat is 'spek' … and 'takel'.) Ohhh. (What do you think about this joke?) I give a 2."

RQ: Waarom loopt een Belg op maandag naast zijn fiets?

RA: Omdat het weekend erop zit.

"Ooh, I do get this joke. It is about next to (naast), and on the bike (erop zitten). (Yes, and why does he do this on Mondays?) Because then the weekend is over. I think it is a 2 worth. (Still a bad joke?) Yes."

RQ: Wat heeft Shakira voor en hebben de Pussy Cat Dolls achter?

RA: De S.

"Ohh, I do get this joke. Shakira starts with the letter S and the Pussy Cat Dolls ends with the letter S. (Yes, you are right. How funny do you think this joke is?) I give a 1."

RQ: Wat is het verschil tussen jou en een brief?

RA: Een brief is geschreven en jij bent getikt.

"I am what? (you are 'getikt') Tsss, yes I like this one! (Yes? Can you explain it to me?) 'Getikt', how do I have to explain this. I think I cannot explain this. (Een brief is geschreven en jij bent getikt. What means 'getikt'? What is it meant if someone says this to you?) I think it has something to do with letters and computers. (Yes, but what is actually meant?) Yes, that I am 'getikt' (crazy). ('Getikt' on the computer or 'Getikt' in the head?) In the head. (Yes, a little bit 'getikt (crazy)! I give a 3 for this joke."

Record of conversation with Niels, which attended 9th grade of the pre-academic school track

RQ: Wat is het verschil tussen een strafschop van het Nederlands elftal en een biertje?

RA: Een biertje gaat er altijd in.

"I like this joke! (Yes? And can you explain it to me?) Yes, the Dutch football team always misses penalties. And one can always drink beer. A 4."

RQ: Hoe voorkom je dat bejaarden gaan ruiken?

RA: Door hun neus eraf te snijden.

"Mmoah, I do not like this joke. (And can you explain it to me? What is the trick?) Yes, it was said that one cannot smell anymore. By cutting of the noses one cannot smell anymore. (Did you think also about something else?) Yes, that they stink themselves. I give a 2."

RQ: Wat is het verschil tussen een Belg en een foto?

RA: Een foto is wel ontwikkeld.

"Yes, I like this one. (Can you explain it to me?) Yes, Belgians are very stupid; at least that is what is told by some people. They are not developed completely, and pictures are. (Yes, indeed. What do you think of this joke?) I give a 4."

RQ: Wat is het tegenovergestelde van een Marokkaan?

RA: Een pabroekuit.

"What did he say? (Pabroekuit) I think that they mean pa-broek-uit, and that the Moroccan is doing that. (No, that is not totally correct. What do you get when you divide the word 'Marokkaan' into pieces? The answer is the opposite of 'pabroekuit'.) Ohh, no I see it. Okay. (And what do you think about this joke?) I give a 2, since I did not understand it myself."

RQ: Wat doe je als je schoonmoeder uitgaat?

RA: Haar opnieuw aansteken.

"I did not hear it. (Okay, I will play the audio again. …) Hmm, I do not think this is funny. She is going out, and then you put her on fire. But actually they mean going out like going to a pub. The meaning is changed, by the part 'opnieuw aansteken'. I give a 3."

RQ: Kunnen Surinamers harder reopen dan hun gettoblasters?

RA: Natuurlijk, want gettoblasters kunnen helemaal niet roepen.

"Hmm, this one I either do not like. (Okay, but can you explain it to me?) Yes, gettoblasters cannot shout, so Surinamese people will always shout louder than radio's. (Yes, indeed.) I think this is worth a 1."

RQ: Hoe noem je een lift voor een dikkerd?

RA: Een spektakel

"Yes, I get this joke. (Okay, can you explain it to me?) Yes, a 'spektakel' for a fat man, because he has a lot of fat (spek). And you have to hoist this fat man up (optakelen). I give a 3."

RQ: Waarom loopt een Belg op maandag naast zijn fiets?

RA: Omdat het weekend erop zit.

"Oh yes, I like this one. (Can you explain it to me?) Yes, the weekend is sitting on his bike. So he cannot cycle anymore. (And why does he doe this on Mondays?) Then, the weekend is over. I give a 4."

RQ: Wat heeft Shakira voor en hebben de Pussy Cat Dolls achter?

RA: De S.

"Yes, Shakira begins with the letter S and Pussy Cat Dolls ends with an S. But you might think that it is about something else. (Okay, about what then?) Uhm, I do not know that. (Parts of the body maybe?) Yes, for example. (Okay, what do you think about this joke?) I give a 3."

RQ: Wat is het verschil tussen jou en een brief?

RA: Een brief is geschreven en jij bent getikt.

"Uhhm, I do not like this one. (Can you explain it to me?) Well, we are 'getikt' (crazy) so we are crazy. And a letter is written by hand. (And if the joke would be: 'een brief is geschreven en jij bent gek', would the joke become better or worse?) Then it becomes worse, because a letter can also be typed. (Yes, indeed. What do you think about it?) I give a 2."

Appendix 6 Explanation examples

Riddle	Full comprehension	Partial comprehension	No or wrong comprehension
Q: Waarom gaat een dom blondje op vrijdag door het raam naar buiten? A: Omdat het weekend voor de deur staat.	Maarten (7th grade, pre-academic): *"On Fridays it is almost weekend and then one says 'het weekend staat voor de deur'. Actually, the weekend does not stand in front of the door, but the blonde interprets it literally. Therefore, she goes outdoors through the window in stead of through the door."* Language-oriented	Linda (7th grade, vocational): *"One says that blondes are stupid. And because she is stupid she goes outdoors through the window. (But why does she go through the window and not through the door?). Because it is almost weekend, and she does not like that, so she goes through the window."* Language-oriented	Cherie (9th grade, vocational): *"She goes through the window, because it is too crowed."* World-oriented
Q: Wat is het verschil tussen een brief en jou? A: Een brief is geschreven en jij bent getikt.	Jennifer (9th grade, vocational): *"A letter is written by hand and you are 'getikt' means that something can be typed. But here they mean that you are crazy".* Language-oriented	Yara (9th grade, vocational): *"Well, 'getikt' means that you are a little bit crazy. A letter is written. The rest I do no know how to explain."* World-oriented	Jonathan (9th grade, vocational): *"'getikt?' How can we be 'getikt"? I do not understand it."* World-oriented
Q: Hoe noem je een lift voor een dikkerd? A: Een spektakel.	Koen (7th grade, pre-academic): *"Because the man is so thick, they call him fatso, and bacon (spek) is also fat. And an elevator can people hoist up (optakelen)."* Language-oriented	Verona (7th grade, vocational): *"Fat is in the word, and people have fat when they are thick. (Has 'takel' anything to do with it?) No, nothing at all."* Language-oriented	Rachiel (9th grade, vocational): *"Well, fat people do not fit in standard elevators and it is quite a 'spektakel', a miracle, to get such a person into an elevator."* World-oriented
Q: Wat heeft Shakira voor en hebben de Pussy Cat Dolls achter? A: De S.	Anneloes (9th grade, pre-academic): *"I was thinking on their bodies; on their breasts and their bottom. But it could also refer to the fact that Shakira starts with an S and the Pussy Cat Dolls ends with an S."* Lanugage-oriented	Kenny (9th grade, vocational): *"It is about the letter. (But why on the letter S??) That, I do not know."* Language-oriented	Kimberly (9th grade, vocational): *"The 'ass' means bottom, and Shakira has a bigger bottom than the Pussy Cat Dolls. (Okay, could de S refer to something else as well?) No, not really."* World-oriented

Appendix 7 Correlation overviews

Table A Overview of significant correlations as a function of the overall sample

	Overall sample
Reading Vocabulary test *[1] Language Cito Eindtoets	.714**
Reading frequency *[2] Newspaper reading frequency	n.s.
Reading frequency *[2] Newscast watching frequency	n.s.
Newspaper reading frequency *[2] Newscast reading frequency	.361**

** p<.05, ** p<.001; n.s.: not significant*
1) Pearson's correlation is used; 2) Spearman's rank correlation is used

Table B Overview of significant Pearson correlations for riddle comprehension between the riddle categories

	Meaning-F * Lexical	Meaning-F * Sentence	Meaning-F * Conceptual	Lexical * Sentence	Lexical * Conceptual	Conceptual * Sentence
Overall sample	.461**	.627**	.505**	.491**	.420**	.517**

** p<.05, ** p<.001*

Table C Overview of significant Pearson correlations between the riddle comprehension and linguistic competences for the overall sample, grade and school track

	MF * RVT	Lex * RVT	Sen * RVT	Con * RVT	MF * Cito	Lex * Cito	Sen * Cito	Con * Cito
Overall sample	.518**	.472**	.465**	.374**	.566**	.432**	.130**	.376**
Grade								
Grade 7	.367*	.441**	.318*	n.s.	.497**	.405**	n.s.	n.s.
Vocational								
Pre-academic								
Grade 9	.594**	.464**	.547**	.469**	.613**	.442**	.629**	.580**
Vocational	.446*	n.s.	n.s.	n.s.	n.s.	.479*	n.s.	n.s.
Pre-academic	n.s.	n.s.	n.s.	.432*	n.s.	n.s.	n.s.	n.s.
School track								
Vocational	n.s.	n.s.	n.s.	.294*	n.s.	n.s.	n.s.	n.s.
Pre-academic	.331*	n.s.	.365*	n.s.	n.s.	n.s.	n.s.	n.s.

*p<.05, ** p<.001; n.s.: not significant; MF: Meaning-form ambiguity; Lex: Lexical ambiguity; Sen: Sentence ambiguity; Con: Conceptual; RVT: score on Reading Vocabulary test; Cito: score for language on Cito Eindtoets*

Table D Overview of significant Pearson correlations between explanation orientation and riddle comprehension for the overall sample, grade and school track

	Meaning-Form EO * Meaning-Form RC	Lexical EO * Lexical RC	Sentence EO * Sentence RC	Conceptual EO * Conceptual RC
Overall sample	.895**	.816**	.913**	.666**
Grade				
Grade 7	.903**	.859**	.905**	.626**
Vocational	.845**	.849**	.869**	.579**
Pre-academic	.906**	.902**	.943**	653**
Grade 9	.886**	.772**	.913**	.706**
Vocational	.869**	.763**	.930**	.700**
Pre-academic	.791**	n.s.	.595**	n.s.
School track				
Vocational	.863**	.788**	.904**	.647**
Pre-academic	.857**	.769**	.889**	.639**

** p<.05, ** p<.001; n.s.: not significant; EO: Explanation orientation; RC: Riddle comprehension*

Table E Overview of significant Pearson correlations for number of correct orientation demonstrations between the riddle categories for the overall sample

	Meaning-F * Lexical	Meaning-F * Sentence	Meaning-F * Conceptual	Lexical * Sentence	Lexical * Conceptual	Conceptual * Sentence
Overall sample	.248*	.540**	.326**	.424**	n.s.	.263*

** p<.05, ** p<.001; n.s.: not significant*

Table F Overview of significant Pearson correlations between explanation orientation and linguistic competences for the overall sample, grade and school track

	MF * RVT	Lex * RVT	Sen * RVT	Con * RVT	MF * Cito	Lex * Cito	Sen * Cito	Con * Cito
Overall sample	.478**	.313**	.416**	.250*	.500**	.338**	.380**	.252*
Grade								
Grade 7	.339*	n.s.	n.s.	n.s.	.433**	n.s.	n.s.	n.s.
Vocational	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Pre-academic	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Grade 9	.555**	.363**	.498**	.318**	.543**	.399**	.573**	.454**
Vocational	.537**	n.s.	n.s.	n.s.	.570**	n.s.	n.s.	n.s.
Pre-academic	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
School track								
Vocational	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Pre-academic	n.s.	n.s.	.302*	n.s.	n.s.	n.s.	n.s.	n.s.

*p<.05, ** p<.001; n.s.: not significant;*

MF: Meaning-form ambiguity; Lex: Lexical ambiguity; Sen: Sentence ambiguity; Con: Conceptual

RVT: score on Reading Vocabulary test; Cito: score for language on Cito Eindtoets

Table G Overview of significant Pearson correlations for mean appreciation marks between the riddle categories as a function of the overall sample

	Meaning-F * Lexical	Meaning-F * Sentence	Meaning-F * Conceptual	Lexical * Sentence	Lexical * Conceptual	Conceptual * Sentence
Overall sample	.478**	.631**	.543**	.498**	.371**	.458**

** p<.05, ** p<.001*