

VERBAL KNOWLEDGE LEVEL, V_L

Verbal knowledge level, V_L , is one of three primary causal factors at Echelon 3 in the causal model, along with pronunciation knowledge level, P_L , and cognitive speed level, C_L . Remember also from Chapter 1 that verbal level is one of the two proximal causes of accuracy level, along with pronunciation level. An individual cannot achieve highly in reading without a high level of verbal knowledge, V_L , but having a high verbal knowledge level is not enough to guarantee high reading achievement as the documented cases of some dyslexics attest (Levine & Osbourne, 1989).

Verbal knowledge is a prerequisite for growth in accuracy level, A_L , when children are beginning to learn to read. Without basic knowledge of the language, children in the early grades will not gain much in A_L during a school year. However, beginning readers who have high levels of V_L do not have a great advantage over those with moderate or average levels of V_L ; individual differences in pronunciation level, P_L , are of much more consequence than individual differences in verbal level, V_L , in their effect upon A_L for beginning readers. For most intermediate readers, V_L and P_L are two equally important factors influencing accuracy level, A_L . For advanced readers, verbal level becomes inextricably tied to accuracy level, A_L , so that a gain in one automatically results in a corresponding gain in the other. This means that for many adults, the amount of verbal knowledge and the level of difficulty of material that a student can accurately comprehend while reading or listening are all so closely tied together that they cannot be empirically or theoretically differentiated (see Chapter 17).

In this chapter, the V_L construct will be defined, and then traditional concepts that are related to V_L will be described. Then, relevant tests measuring V_L will be described. Empirical evidence relevant to the existence of V_L will also be reviewed.

Theoretical Construct

Verbal knowledge level, V_L , is the amount of verbal knowledge a person has, measured in GE units; this construct will generally be referred to by its shortened name of "verbal level" or by its symbol, V_L . This theoretical con-

struct refers to all the world knowledge, background knowledge, or general knowledge a person has accumulated and remembers that is in the form of spoken words or language.

The V_L construct was created to achieve the goal advanced by Cronbach (1957) when he encouraged the creation of variables with minimum redundancy, that "... permit us to obtain maximum information from a minimum of experimental investment" (p. 677). With respect to the present goal of delineating the primary causes of high and low reading achievement, there does not seem to be any justification for trying to keep levels of verbal knowledge separate from (a) levels of ability to comprehend while listening to text being read aloud at varying levels of difficulty, (b) listening vocabulary, or levels of knowledge of the meaning of spoken words that vary in difficulty, or frequency of usage, or (c) levels of general knowledge that involves speaking and listening. For example, it would seem to be very unlikely for an individual to have a fifth-grade level of verbal knowledge, or V_L , and have a substantially different level of listening comprehension, have a substantially different level of listening vocabulary, or have a substantially different level of general knowledge, no matter how these concepts were measured—unless, of course, the measures were not highly reliable. The close connection between V_L and A_L in the causal model is mirrored by the traditionally close connections among general knowledge, vocabulary, listening, language, and reading.

The above definition of verbal knowledge level has much in common with the definition of "conceptual knowledge," given by Alexander, Shallert, and Hare (1991). They state that conceptual knowledge is made up of content knowledge and discourse knowledge with word knowledge (or vocabulary knowledge) overlapping with both content and discourse knowledge. For example, conceptual knowledge about human biology would involve knowledge of the systems of the body (content) and knowledge of how the concepts are related via language (discourse) as well as a knowledge of the words involved (what a "brain" is and that this word is used as a noun not a verb). Verbal knowledge is inextricably tied to vocabulary knowledge, yet it refers to more than the knowledge of the meaning of individual words. Verbal knowledge also involves what Alexander, Shallert and Hare (1991) call declarative (factual), procedural (how), and conditional (when and where) knowledge as long as these types of knowledge involve words or language.

Verbal knowledge does not refer to certain skills, such as knowing how to ride a bicycle—a psychomotor skill that is not represented in the form of words. It also does not refer to metacognitive knowledge, that is, knowledge of regulating one's cognition.

In short, verbal knowledge refers to all the conceptual knowledge that is useful for understanding sentences when listening to them being spoken, i.e., aural. Verbal knowledge level measured in GE units refers to increasing amounts of verbal knowledge that allow the sentences in increasingly difficult texts to be comprehended when they are aural.

The V_L construct also has a close connection to another theoretical construct, called audamatized words—not to be confused with automatized words. Words that can be comprehended when presented auditorily at the rauding rate of the individual, are called audamatized words. The size of the lexicon of audamatized words (V_L Words) is an indicant of V_L .

When individuals are listening to spoken sentences, or when written text is being read to them, the words are likely to be audamatized. That is, when textual material is being read aloud to the individual, and the individual is comprehending the sentences, then the words in the sentences are audamatized because they are readily recognized and comprehended. The learning curve for transforming an unknown spoken word into an audamatized word, is ordinarily not of direct interest to reading researchers. However, the concept of a lexicon of audamatized words, V_L Words, seems to be just as important for spoken words as the concept of raudamatized words, A_L Words, is important for printed words. Raudamatized words are audamatized words that can be comprehended just as accurately and quickly in print as they are when they are auded.

Related Traditional Concepts

Introduction. Chall (1983) has related knowledge, vocabulary, and reading as follows:

"World knowledge" and vocabulary, both developed through wide reading, are also essential for reading development. Thus, education and reading are circular—the more a person has of one, the better the development of the other. The more the knowledge, the better the reading; the better the skill and uses of reading, the better the knowledge. (p. 8)

Similarly, Carroll (1993) states that "language acquisition is, in fact, largely a matter of the development of long-term semantic memory-information, that is, about the meanings and uses of words and other aspects of language structure" (p. 194); he goes on to say that "tests of vocabulary are in the main tests of knowledge" (p. 198).

The next subsection will describe in more detail how V_L is related to listening comprehension. Then, V_L will be related to three other concepts often used in psychology, namely, verbal ability, verbal intelligence, and verbal comprehension.

Listening comprehension. The concept of listening comprehension connotes an on-line process that is likely to be more relevant to 1 second of reading or 1 minute of reading, instead of 1 year of reading. Because V_L is a construct that is directly relevant to 1 year of reading, then it is more similar to the con-

cept of listening comprehension ability or listening level. The more traditional concepts of listening comprehension, language knowledge, or linguistic comprehension are similar to V_L as long as these concepts are considered to be individual difference factors rather than within individual processing factors. Any listening comprehension measure that involves words of varying frequencies of usage, or passages of varying difficulty, should correlate highly with any purported measure of V_L .

The close connections among listening vocabulary, listening comprehension, and V_L are evident from a definition of listening comprehension given by Hammill and McNutt (1980), prior to their review of research in this area. They stated that "the construct of listening comprehension includes all tests or subtests designed to measure oral receptive language" (p. 271), and that "the tests or subtests designed to measure listening comprehension usually relate to one or two specific constructs: receptive vocabulary and contextual listening" (p. 271). Translated, this means that the number of V_L Words should be highly correlated with a listening comprehension measure of V_L .

The close connection between V_L and listening level was even more obvious in earlier published research on rauding theory. In those publications prior to 1994, the V_L construct was symbolized by $AudA_L$ and it was called auditory accuracy level, or auditing accuracy level. Because auditing and listening are the same concepts in the context of language comprehension, it can be seen that V_L evolved from a concept of listening comprehension level.

There is a very close connection between the traditional concepts of listening comprehension, or language knowledge, and V_L .

Verbal ability. The meaning of "verbal ability" has been discussed at some length by Campito (1994). He said that verbal ability was "a technical term used by cognitive and educational psychologists to refer to (1) the amount and structure of one's verbal knowledge, often called vocabulary knowledge, and (2) the ability to reason by using this verbal knowledge" (p. 1107). Campito goes on to say that verbal ability has "two broad facets: a knowledge facet and a cognitive processing facet" (p. 1107). The part of Campito's definition of verbal ability which refers to the amount and structure of one's verbal knowledge, often called vocabulary knowledge, has much in common with the V_L construct. However, the part of Campito's definition of verbal ability which deals with the ability to reason does not have much in common with the V_L construct.

Campito also stated that "verbal ability, represented by such behaviors as 'displays a good vocabulary,' 'reads with high comprehension,' 'is verbally fluent,' and 'converses easily on a variety of subjects,' was found by Sternberg, Conway, Ketron, and Berstein (1981) to be the first of three major factors defining intelligence for both experts in the field of intelligence and lay people" (p. 1107). So, V_L not only has much in common with verbal ability but it is also indirectly associated with verbal intelligence.

E. Hunt (1978) noted that "one of the reasons verbal ability tests do predict performance is that they test knowledge, and the amount of knowledge one possesses is a good guide to general cognitive competence" (p. 111). Thus, Hunt has strengthened the case for V_L having much in common with the traditional concept of verbal ability because verbal ability is closely associated with knowledge.

In summary, there is a very close connection between V_L and the knowledge aspect of verbal ability, but the reasoning aspect of verbal ability is not closely related to V_L (see Chapter 20 which relates reasoning to reading).

Verbal intelligence. There is a very high relationship between verbal intelligence and the V_L construct. Anderson and Freebody (1981) have stated that "the strong relationship between vocabulary and general intelligence is one of the most robust findings in the history of intelligence testing" (p. 77). Furthermore, the concept of verbal intelligence is very closely related to crystallized intelligence because both involve verbal knowledge or word knowledge. Later, Chapter 20 expounds upon how crystallized intelligence, G_c , which is the breadth and depth of knowledge of the individual's culture, relates to reading achievement.

In the causal model presented in Chapter 1, a distinction was made between g_v and V_L , where g_v is an aptitude or intelligence type of construct that represents a kind of ability not strongly influenced by education or instruction, whereas V_L was influenced by teaching and learning as well as g_v . The traditional concepts of verbal intelligence and crystallized intelligence connote more of a focus upon g_v than V_L , yet, this distinction is often blurred when the operational definitions in research involve measures that may involve V_L as much as g_v . That is, some tests of verbal intelligence, verbal aptitude, and crystallized intelligence are likely to contain items that are highly influenced by teaching and learning, and therefore may have as much in common with V_L as g_v .

In summary, verbal intelligence is a concept that is similar to both V_L and g_v , but most measures of verbal intelligence are more highly related to g_v than to V_L .

Verbal comprehension. It will be helpful to compare the construct of verbal level, V_L , to the concept of "verbal comprehension" as used by Sternberg and Powell (1983). They define this latter concept as "a person's ability to understand linguistic materials, such as newspapers, magazines, textbooks, lectures, and the like" (p. 878). A person's ability to understand newspapers, magazines, and textbooks would often be referred to as reading comprehension, or A_L , and a person's ability to understand lectures might be referred to as listening comprehension, or V_L . So, verbal comprehension seems to mean the same as reading and listening comprehension. Sternberg and Powell go on to state that verbal comprehension "... can be operationalized in a number of dif-

ferent ways" (p. 878) and that "most often, it is directly measured by tests of vocabulary, reading comprehension, and general information" (p. 878). They go on to note that learning vocabulary from the context of what is heard or read "can facilitate vocabulary level at the same time that a higher vocabulary level can facilitate learning from context" (pp. 880, 881).

From this operational definition of verbal comprehension given by Sternberg and Powell, it can be seen that it has much in common with V_L , in that both can be measured by vocabulary tests and tests of general information, or world knowledge. However, V_L for early and middle graders would ordinarily be measured by a listening comprehension test rather than a reading comprehension test, as noted at the outset of this chapter. This apparent difference between listening and reading evaporates, however, when dealing with many adult readers, such as most college students (see Chapter 17). When dealing with advanced readers, the concept of verbal comprehension as discussed by Sternberg and Powell seems to be very similar to the construct of V_L in the causal model. Sternberg and Powell go on to state that "vocabulary has been recognized not only as an excellent measure of verbal comprehension but also as one of the best single indicants of a person's overall level of intelligence" (p. 878).

The main thrust of Sternberg and Powell (1983) was to present their own theory of verbal comprehension, or general verbal ability, which is actually a theory of learning new vocabulary from context. In short, they presented a model of the factors that influence the learning of the meanings of words from context, and therefore it is a theory of what causes an increase in V_L , a subject that will be focused upon later in Chapter 12.

In summary, there is an extremely close connection between the concept of verbal comprehension and the V_L construct.

Relevant Tests

Introduction. Two tests that are relevant to measuring V_L are the Auding Accuracy Level Test, AALT, and the General Information subtest from the Peabody Individual Achievement Test, PIAT. These two tests will be described, and then some theory about testing V_L will be presented.

Auding Accuracy Level Test. In previous research on reading theory, the construct of V_L (or $AudA_L$ prior to 1994) has been measured using a listening vocabulary test, called the Auding Accuracy Level Test (AALT). On this test, the individual is presented a target word auditorily, and then is presented three alternative answers (see Carver & Clark, 1998). One of the three alternative words means about the same thing as the target word (a synonym), and the other two alternatives have a meaning that is not close to the target word or its

synonym. The scores on this test are scaled into GE units thereby providing an indirect measure of V_L .

The AALT is actually the same test as the ALT, described earlier in Chapter 4, except the words on the ALT are read aloud to the examinees on the AALT. Some researchers may question the use of the AALT as a measure of V_L from three standpoints. First, listening vocabulary tests used to measure verbal knowledge level is an indicant, and therefore not as authentic as a direct measure. However, as contended earlier, listening vocabulary knowledge is an important part of verbal knowledge or conceptual knowledge, so it would seem reasonable to use a person's knowledge of increasingly difficult (lower frequency) words presented auditorily as an indicant of V_L .

The second objection to the AALT is likely to be a procedural one. The words are presented on the AALT auditorily at the same time as they are presented in print, or on the computer screen. This procedural condition might contaminate the listening measure with unwanted effects due to variation in reading ability. However, Carver (1998c) has presented evidence that mitigates against this procedural detail being an important problem.

The third objection to the AALT as an indicant of V_L is also likely to be procedural—the administration of the same vocabulary words first by reading on the ALT and then by listening on the AALT. That is, if Form A of the ALT is administered and Form A of the AALT is administered, then the individual will be given exactly the same words on both tests. This procedural condition could produce a major practice effect. However, in the same research just noted (Carver, 1998c), the results indicated that no advantage accrued to those who had seen the same words earlier.

General Information. The Peabody Individual Achievement Test, PIAT, contains a General Information subtest that should provide a measure of V_L . It contains questions that are read aloud to the individual by an examiner. Because the raw score can be converted into a GE score, this test should provide a direct measure of V_L .

Test Theory. A direct measure of verbal level, V_L , would involve a sampling of all the verbal knowledge that a person has. That is, a direct measure would try to sample everything a person knows in the form of words, and then scale this knowledge into GE units.

Measures of listening comprehension that involve passages at varying levels of difficulty should provide excellent indicants of V_L . Furthermore, any auditorily administered measure of general knowledge, world knowledge, background knowledge, or cultural literacy should sample much the same universe of knowledge as that defined as verbal knowledge, and therefore should provide an indicant of V_L . That is, accuracy measures that involve auditorily presented words varying in difficulty—where a premium is not put on the ability to read and a premium is not put on rate—should provide a good indicant of V_L . This

means that most auditorily administered vocabulary tests should also provide excellent indicators of V_L . However, it would seem possible to develop vocabulary tests so that they maximally discriminated between individuals at a particular age and therefore evolved into measures that were more highly related to verbal aptitude, g_v , than with verbal knowledge level, V_L .

A vocabulary test that has been designed to measure IQ, such as the vocabulary section of the Stanford Binet Intelligence Test, has also been designed to maximally discriminate between individuals at the same age level. This means that the items have not been selected to measure learning, gain, or progress. Because of this difference between psychometrically developed tests and edometrically developed tests (Carver, 1974), listening vocabulary measures developed for an IQ test are likely to be better indicants of g_v than V_L .

Summary of Theory

Verbal knowledge is all the knowledge that an individual possesses in the form of words, and verbal knowledge level is that knowledge scaled into GE units. Therefore, verbal level, V_L , is a theoretical construct that attempts to incorporate several traditional concepts, such as general knowledge, world knowledge, background knowledge, conceptual knowledge, language knowledge, and listening vocabulary. V_L also attempts to incorporate the concept of listening comprehension or verbal comprehension, that is, the ability to comprehend auditory presentations of increasingly difficult text. V_L is also related to the concepts of verbal ability and verbal intelligence except that these concepts are likely to involve more reasoning, or fluid intelligence, G_f , and therefore are likely to be more related to verbal knowledge aptitude, g_v .

A direct measure of V_L would involve a sampling of all the verbal knowledge possessed by an individual, whereas indicants of V_L would include measures of listening comprehension, and auditory measures of general knowledge. A measure of all the words that an individual could recognize and comprehend when listening, called automatized words or V_L Words, should be a good indicant of V_L , and would provide an indirect measure of V_L when scaled into GE units. One existing indirect measure of V_L is an auditorily administered vocabulary test, called the Auditory Accuracy Level Test, AALT. An existing direct measure of V_L would be the General Information test from the PIAT.

Summary of Evidence

Scores on listening vocabulary tests are almost perfectly correlated with scores on listening comprehension tests when both measures are corrected for attenuation ($r = .91$, from Sticht, Hooke, & Caylor, 1982). These data strengthen the case for V_L being a construct that encompasses both listening vocabulary knowledge and listening comprehension.

Measures of cultural literacy (or general knowledge) and vocabulary for adults are highly correlated, especially when corrected for attenuation ($r = .78$, from West, Stanovich, & Mitchell, 1993). These results strengthen the case that V_L incorporates both general knowledge and vocabulary.

Implications

Verbal knowledge level, V_L , is an extremely important construct when investigating the causes of high and low reading achievement. It incorporates other very important concepts in education and psychology, namely, level of listening comprehension, level of listening vocabulary, and level of general knowledge or world knowledge. V_L needs to be measured separately from verbal ability and verbal intelligence which are likely to be more highly related to fluid intelligence, G_f , and verbal knowledge aptitude, g_v .

Forget Me Nots

Verbal knowledge level, V_L , is a theoretical construct that tries to incorporate all of the good ideas that have traditionally been associated with the following concepts: (a) level of listening vocabulary, (b) level of listening comprehension, and (c) level of general knowledge, world knowledge, or conceptual knowledge. These earlier concepts have been upgraded by the V_L construct, which is more precisely defined both from a theoretical and an operational standpoint. Verbal level, V_L , is the amount of verbal knowledge an individual has when that knowledge is scaled into grade equivalent units; for example, an individual may have a fourth-grade verbal level, $V_L = 4$.

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*To Mary Lou, Melanie, Heather,
Bill, Jay, and last but not least, Joey.*

6/7/00
JPM