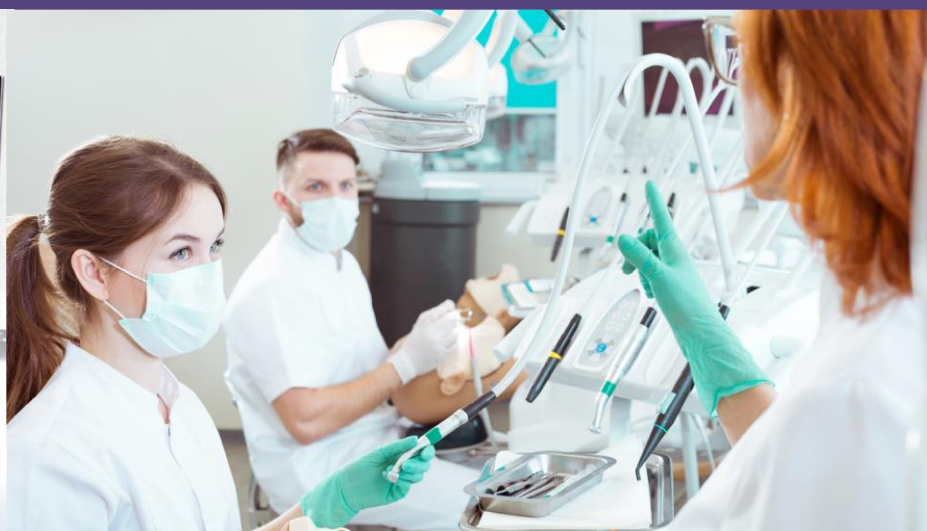


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Using the Admission Test for Dental Hygiene (ATDH) for Admission Purposes: A Guide for Dental Hygiene Education Programs (2021)



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Overview

The American Dental Association's (ADA) Admission Test for Dental Hygiene (ATDH) is designed to provide dental hygiene programs with an additional means to assess applicants' potential for success in dental hygiene programs.

The ATDH is composed of multiple-choice questions (items) presented in English, and is developed according to established test specifications. The examination consists of six sections: Reading Comprehension, Language Usage, Quantitative Reasoning, Perceptual Ability, Biology, and General Chemistry.

This guide is intended to provide dental hygiene programs with information concerning the appropriate use and interpretation of ATDH results. Additional information concerning the ATDH Program is available online at ADA.org/ATDH. The website contains the ATDH Candidate Guide, which provides further details concerning ATDH administration.

Utilization of ATDH Results in Admission Decisions

Use of the ATDH takes place within the context of dental hygiene programs' standard admission procedures. Each program differs in how admission decisions are made, and the specific tools available to support those decisions. The following provides general considerations for using ATDH results in admission decisions.

The ATDH and Dental Hygiene Program Admission Decisions

- Each dental hygiene program must make its own decision concerning how to use ATDH results.
- In making decisions as to how to appropriately use admission tools—including ATDH results—programs should carefully consider the following:
 - Program and school requirements
 - The prerequisite level of knowledge, skills, and abilities that a candidate must possess at entry into the program, in order to benefit from the educational training provided by the program.
 - The characteristics and behaviors that can derail students and lead to failure (e.g., poor study habits).
 - Licensure requirements
 - The knowledge, skills, abilities, and other characteristics (KSAOs) necessary to succeed in the profession of dental hygiene, including the skills necessary to keep up with changes in the profession over time.

Use of Current Admissions Tools

- Dental hygiene programs each rely upon specific admissions tools to inform candidate admission decisions.
- Based on surveys and focus groups conducted with dental hygiene program directors in 2019 and 2020, the following is a sampling of admission tools currently being used by dental hygiene programs:

- Standardized tests (computer-based and/or paper-based)
- Candidate interviews
- Applicant essays
- High school and/or college grades
- Grades, GPA, and pass/fail status with regard to prerequisites or specific courses
- References and letters of recommendation
- GED results
- It is important to note that anything used to make an admissions decision essentially serves as a test, and should be subject to the same evaluative criteria. Consider the interview, for example:
 - Indicating that a candidate did not do well in an interview is essentially indicating that they did not pass the “interview test.”
 - Interview questions represent the content of the test. To the degree that interviewers asked different questions of each candidate (e.g., by asking probing questions based on candidate responses, or by departing from the interviewer script), each candidate may have experienced a different test (i.e., a departure from standardized conditions)
 - Interviewer ratings of candidate responses—or simply the interviewer’s verbal opinions on how the interview went—serve as the results of the test, with the interviewer themselves serving as the scoring mechanism (potentially using rating scales, etc.)
 - To the degree that different individuals might conduct these interviews, each candidate could effectively be facing a different scoring mechanism (or scoring key), which may or may not substantially differ due to factors such as rater severity, leniency, halo effects, “similar-to-me” bias, and other forms of bias (depending upon how raters are trained and calibrated, and how well they adhere to standardized procedures).
- Specific measurement tools can rely on differing measurement methods, with certain measurement methods better equipped to measure particular KSAOs.
 - Interviews are well-suited to measuring oral expression and oral comprehension skills, but poorly suited to measuring written expression and written comprehension skills
 - Objective structured clinical examinations are well-suited to measuring candidate clinical skills
- No single measurement tool is perfect. All measurement tools are subject to error.
- The prediction of candidate performance in programs is probabilistic in nature. On average, utilization of professionally developed, validated measurement tools will result in selecting candidates with a higher likelihood of success. The stronger the validity, the more certain the likelihood.
- However, even with validated measurement tools, there will always be some who perform better in school than anticipated, and others who perform less well than anticipated; hence the bullet point indicating that all measurement tools are subject to error.
- A key consideration involves making sure that each measurement tool utilized is fair and unbiased, such that errors in measurement and prediction do not disproportionately affect any particular group.

- Dental hygiene programs should utilize admission tools and measurement methods that are objective and supported by evidence, serving as valid, reliable, and fair measures of the KSAOs that are necessary for candidate success.

The ATDH and the Standards of the Commission on Dental Accreditation (CODA)

- Utilization of the ATDH is consistent with CODA accreditation standards for dental hygiene education programs (CODA, 2019). Consider CODA Standard 2-3, in the area of Admissions:

2-3. Admission of students must be based on specific written criteria, procedures and policies. Previous academic performance and/or performance on standardized national tests of scholastic aptitude or other predictors of scholastic aptitude and ability must be utilized as criteria in selecting students who have the potential for successfully completing the program. Applicants must be informed of the criteria and procedures for selection, goals of the program, curricular content, course transferability and the scope of practice of and employment opportunities for dental hygienists.

Intent:

The dental hygiene education curriculum is a postsecondary scientifically-oriented program which is rigorous and intensive. Because enrollment is limited by facility capacity, special program admissions criteria and procedures are necessary to ensure that students are selected who have the potential for successfully completing the program. The program administrator and faculty, in cooperation with appropriate institutional personnel, should establish admissions procedures which are nondiscriminatory and ensure the quality of the program.

Evaluating Admissions Tools

- All tools used for admission decisions—not just standardized tests—should be evaluated against established professional standards as found in the *Standards for Educational and Psychological Testing* (AERA, APA, NCME, 2014) (“Standards”).
- Programs should understand the strengths and weaknesses of each admission tool currently in place when making admission decisions, as well as the strengths and weaknesses associated with tools currently under consideration. This includes the:
 - specific information the tool provides relative to program requirements and the identified KSAOs
 - quality and accuracy of the information provided, and conversely the amount of error associated with the tool
 - evidence that supports the use of the tool
 - amenability of the tool to psychometric investigation, to understand its strengths and weaknesses
 - extent to which information provided by the tool might be affected by factors unrelated to the KSAOs of focal interest
 - extent to which the tool provides a fair and unbiased evaluation of candidate qualifications

- extent to which the tool permits the candidate to demonstrate the KSAOs required at entry into the program
- legal defensibility of using the tool
- extent to which the tool permits the program to meaningfully compare the program-relevant skills of candidates with differing backgrounds (educational training, etc.)
- overall adherence of the tool to guidance provided in the *Standards*
- The strengths and weaknesses of the set of admission tools utilized, including:
 - how information from different admission tools is weighted in decision making, and how this weighting was determined
 - how weighting of each factor impacts the diversity and representativeness of the selected cohort of candidates
 - how redundancy in the information provided by different tools is handled (e.g., via weighting)
 - any deficiencies that might be present (e.g., helpful or necessary information that may be lacking from the set of tools)
 - the collective impact of using the set of tools on criteria of interest, including the:
 - overall readiness of candidates to benefit from education provided by the program
 - need for remediation for candidates with deficiencies in certain prerequisite areas, and the program's ability to identify and address these needs for any and all such candidates who ultimately enroll, throughout candidates enrollment in the program
 - assistance available to candidates who enter the program but are unsuccessful and depart the program (either voluntarily or involuntarily)
 - anticipated performance of admitted candidates
 - in the dental hygiene program
 - working with patients and addressing patient health conditions
 - as members of the dental hygiene profession
 - Programs should strive to achieve an optimal balance across all of the criteria identified as important, placing greater weight on criteria of greater importance
- Consider the potential presence of subgroup differences.
 - The *Standards* indicate that “subgroup mean differences do not in and of themselves indicate lack of fairness” (p65). In fact, when tests are professionally developed in accordance with the *Standards*, they can provide fair and unbiased information that helps shed light on these types of societal problems. This information can in turn be used in decision making to help address and respond to the underlying issues. The *Standards* emphasize that “Fairness is a fundamental validity issue and requires attention throughout all stages of test development and use.” (p49)
 - The presence of subgroup differences on validated measures of important KSAOs represents a call to thoroughly and carefully consider the implications of those differences, to determine the best path forward.

Considering the Implications of Using (or not Using) Measurement Tools to Inform Decisions

- Measurement tools provide information that can be extremely valuable for program decision making, improving decision making with respect to individual candidates and also in areas beyond candidate selection. This includes use of this information in:
 - modifying curricula and class syllabi based on typical candidate skills levels at entry
 - establishing data-based required minimum performance levels on admission tools, to better correspond with curricula
 - allocating program resources to be used for remediation purposes
 - helping to identify enrollees with knowledge and/or skill deficiencies before coursework begins, so efforts can commence immediately to assist those individuals
 - informing local efforts to better prepare candidates for a career in dental hygiene (e.g., working with local high schools, community colleges, and universities)
- Programs should be cognizant of the implications of not using validated measures of KSAOs to inform admission decisions.
 - *Implications for the public health.* By not considering KSAOs that have been demonstrated to be related to performance, programs can ignore vital information that ultimately has significant implications for the public health. The handling of these factors should be appropriately managed and balanced relative to other considerations, not simply left to chance.
 - *Potential legal risk in the event of a challenge to an admission decision.* If evidence is not available concerning the validity, reliability, and fairness of current admission measures, programs leave to chance the potential presence of bias in those measures, as well as any unintended consequences associated with their utilization. This could lead to legal risk pertaining to discrimination and/or reverse discrimination.
 - *Implications for enrollees, and those who enter a program and are unsuccessful.* Students who are unprepared for a rigorous dental hygiene education may struggle and experience great difficulty. If the school is unsuccessful in remediation efforts it can be embarrassing for the poor performing individuals, and frustrating and demoralizing for those around them who witness the struggle and the school's inability to assist.
 - *Program impact.* When enrollees depart from a program, it impacts the program's goal of graduating individuals who can successfully serve the community, and it affects the program financially.
- Programs should be extremely careful in setting minimum performance standards on admission tools, and should weight such tools appropriately to obtain desired outcomes and avoid negative outcomes.
 - Don't set minimum performance levels too high, particularly when group differences exist; members of lower scoring disadvantaged groups who might otherwise be successful—or who might be successful with additional remediation—could be excluded. Programs may also have a tougher time finding qualified candidates.

- Don't set minimum performance levels too low; students who lack the required KSAO levels may dropout in higher numbers, with corresponding financial burdens, etc. (and little ability to pay back student loans); programs may also need to secure additional resources in order to provide remediation throughout students' enrollment. If minimum performance levels are too low, this also can have implications on the amount and depth of material that can be covered in the curriculum, and the quality of care patients may receive (due to the fact that candidates may not be as knowledgeable and/or skilled in matters pertaining to patient health).
- In short, programs must strive to balance numerous criteria when making admissions decisions, in order to achieve desired outcomes and avoid negative outcomes. Utilization of professionally developed, validated assessments can help in this regard.

Evidence in Support of the ATDH

- While the ATDH is a newer examination, evidence supporting its use is already available, and is anticipated to grow over time.
- ATDH development was guided by the *Standards* and professional best practices.
- The ATDH is supported by content validity arguments.
- The dental hygiene community was critical in providing input used to establish the content areas assessed by the ATDH, as well as ATDH program operating parameters.
- The ATDH Steering Committee—which is composed of experts from the dental and dental hygiene professions—reviewed and approved the test specifications, and test constructors provided additional input. This Steering Committee also made all decisions concerning ATDH Program policy.
- ATDH content was created by highly qualified subject matter experts with expertise in the areas assessed.
- The ATDH is administered under controlled, standardized testing conditions, in secure test centers located throughout the US and Canada.
- The ATDH is implemented by a team of testing professionals, many of whom possess advanced degrees in psychological measurement and related fields; this team—the Department of Testing Services (DTS)—has substantial experience in developing valid, reliable, and fair high-stakes admissions and licensure examinations.
- DTS has historical criterion-related validity evidence supporting the KSAOs appearing on the ATDH, in predicting first-year dental hygiene program performance
- DTS will conduct criterion-related validity studies using ATDH data as soon as logistically feasible, to further support the ATDH Program.

Questions for Programs to Consider

- Concerning each admission tool currently in use in your dental hygiene program:
 - What evidence is available that the tool is valid?
 - What evidence is available that the tool is reliable, and free from random sources of measurement error?
 - What evidence is available that the tool treats subgroups fairly?
 - On what basis was each tool selected?

- On what basis was the content associated with each tool determined?
- Did those who created the content possess the expertise necessary to create the content?
- What data is available about the performance of the tool?
- What are the challenges associated with the tool, and how are those challenges addressed?
- How was the appropriateness of the tool determined, and who made those decisions?
- How is performance on the tool measured, rated, or scored?
- Who conducts the measuring, rating, and/or scoring, and what are their qualifications to do so? How is their measuring/rating/scoring work evaluated?
- Did decisions take into account psychometric performance, and if so was a psychometrician involved?
- If use of this tool was challenged, would your program be able to successfully defend its use of the tool?
- How well does the tool fare, when evaluated against criteria presented in the *Standards*?
- Concerning the ATDH:
 - How does the ATDH compare with existing admission tools, in the areas indicated above?
 - Should your program consider using the ATDH, in light of answers to the above questions?

Additional Comments Regarding the Use of the ATDH to Inform Admission Decisions

- Programs may differ in how they choose to use the ATDH.
 - Some programs may, in recognition of challenges in fairly and accurately comparing applicants across dental hygiene programs, choose to supplement the information from existing admission tools with ATDH results in making candidate admission decisions.
 - Programs may weight ATDH results in accordance with results from a local (i.e., program-specific) validation study, or in accordance with other information available to the program concerning the relationship between ATDH scores and program performance.¹
 - Some programs may choose to use ATDH results only in certain prescribed situations:
 - Situations where little additional information is available concerning candidate qualifications (e.g., no candidate information is available concerning GPA, class rank, or results from other standardized tests).
 - Situations where candidates are equally qualified, and there is a need to break a tie.
 - Some programs may simply collect data on ATDH performance without using it to inform individual admission decisions. Programs can then review the

¹ This option will be available to programs in the future, as data on ATDH performance and student dental hygiene program performance become available.

information, become comfortable with the insight provided, and then decide how best to use ATDH results in future years.

- In deciding how to use the ATDH relative to other admission tools, programs should consider the evidence available to support ATDH usage, as compared to the evidence available for other admission tools that the program is currently using. In considering this, it should be noted that a long history of usage does not constitute evidence of validity.
- Programs should not rely exclusively on ATDH results in making admission decisions. The ATDH should be used in conjunction with other admission tools that provide insight into candidate qualifications as they relate to core program requirements.
- Programs should decide on their approach, and then apply that approach consistently, in compliance with school and legal requirements.

Examination Content and Specifications

The ATDH is composed of multiple-choice test items presented in the English language. The examination consists of six sections: Reading Comprehension, Language Usage, Quantitative Reasoning, Perceptual Ability, Biology, and General Chemistry. Information about each section is provided below.

Reading Comprehension (40 items). The reading comprehension section of the ATDH assesses the candidate’s ability to read, understand, and analyze basic scientific information. The section consists of questions pertaining to reading passages on various scientific topics. Prior familiarity with the specific science topics covered in the passages is not a prerequisite to answering the questions. Reading passages are approximately 450–500 words in length, and there are typically eight items associated with each passage. Items are written in standard American English. Items are written to evaluate whether the candidate possesses reading comprehension skills at a high school graduate or first-year college student proficiency level.

Topic	Description
Main Ideas	Determine the main ideas and supporting details presented in an informational text (e.g., identify the main idea, identify details that support the main idea, summarize the important points of the text).
Inferences and Conclusions	Make inferences and draw conclusions about ideas presented in an informational text (e.g., make inferences about the author’s point of view and purpose, determine whether a given statement is or is not supported by the text, use evidence from the text to support inferences and conclusions).
Relationships Among Ideas	Analyze relationships among ideas presented in informational text and how that text is organized (e.g., how connections are made between ideas, including compare/contrast structure, use of categories, and use of analogies; how one part of the text fits in with the whole; the structure of a

	particular paragraph; the purpose of transition words).
Meaning of Words and Phrases	Determine the meaning of words and phrases used in the context of informational text, including figurative, connotative, and technical meanings.

Language Usage (40 items). The language usage section of the ATDH assesses the candidate's ability to utilize English words, rules, structure, grammar, syntax, style, tone, spelling, and punctuation to facilitate effective written communication. Language usage items are written in standard American English. Items are written to evaluate whether the candidate possesses language skills at a high school graduate or first-year college student proficiency level.

Topic	Description
Spelling, Punctuation, and Capitalization	Identify and correct errors in spelling, punctuation, and capitalization.
Word Usage	Identify and correct errors in word usage.
Grammar	Identify and correct errors in grammar (e.g., subject-verb agreement, pronoun-antecedent agreement, verb tense).
Syntax	Identify and correct errors in syntax (e.g., eliminating fragments and run-on sentences, eliminating dangling and misplaced modifiers, ensuring parallel structure).
Organization of Ideas	Organize written ideas to facilitate effective communication (e.g., combining sentences effectively, using effective transition words and phrases, clarifying the relationship between ideas, revising awkward sentence structure).
Style and Tone	Maintain a formal style and objective tone in written communication. Identify and replace non-standard English words and phrases.

Quantitative Reasoning (40 items). Quantitative reasoning items require candidates to solve problems by applying critical thinking skills, along with knowledge of core principles in quantitative disciplines such as algebra, probability, and statistics. Items are targeted at the level of the college-ready high school graduate who has successfully completed courses in algebra I and algebra II.

Topic	Description
Algebra	Solve algebraic problems involving equations and expressions, inequalities, exponential notation, absolute values, ratios and proportions.
Probability and Statistics	Apply probabilistic reasoning skills; calculate and interpret probabilities; calculate and interpret basic statistics such as means, medians, or ranges.

Interpretation of Quantitative Information	Understand and interpret quantitative data presented in graphs or tables.
Word Problems	Solve word problems by applying principles from algebra, probability, and statistics.

Perceptual Ability (60 items). The perceptual ability section of the ATDH assesses the candidate's ability to accurately perceive object dimensions and mentally manipulate objects in space. This includes, for example, the ability to differentiate among angles, or imagine how three-dimensional objects appear when viewed from different angles.

Topic	Description
Apertures	Evaluate a three-dimensional object and determine if it can pass through an opening.
View Recognition	Imagine how an object appears when viewed from different angles.
Angle Discrimination	Rank a series of angles from smallest to largest.
Paper Folding	Mentally unfold a piece of paper that has been folded one or more times and then hole-punched.
Cube Counting	Evaluate a stack of cubes and determine how much of each cube is exposed.
Spatial Relations	Identify the three-dimensional shape that a flat pattern produces when folded in a specific way.

Biology (30 items). The biology section of the ATDH assesses the candidate's ability to understand, apply, and integrate introductory concepts in biology that are relevant to the health sciences. Items are targeted at the level of the college-ready high school graduate who has successfully completed a high school course in biology.

Topic	Description
Cell and Molecular Biology	Cell metabolism; Cellular processes; Organelle structure and function; Mitosis/meiosis; Cell structure; Biomolecules
Diversity of Life: Biomedical Organization and Relationship	Plantae; Animalia; Protista; Fungi; Eubacteria (Bacteria); Viruses
Structure and Function	Homeostasis; Communication; Nutrient processing; Water balance; Gas exchange; Movement
Genetics	Molecular genetics; Human genetics; Mendelian genetics; Gene expression
Evolution and Ecology	Natural selection; Ecology

General Chemistry (30 items). The general chemistry section of the ATDH assesses the candidate's ability to understand, apply, and integrate introductory concepts in general chemistry that are relevant to the health sciences. Items are targeted at the level of the college-ready high school graduate who has successfully completed a high school course in chemistry.

An exhibit button that displays a pop-up image of the periodic table of elements is available during the General Chemistry section of this examination.

Topic	Description
Stoichiometry and General Concepts	Percent composition; Balancing equations; Moles, molar mass, molecular formula; Density; calculations from balanced equations; Chemical nomenclature; Oxidation-reduction reactions; Periodic properties and trends
Gases	Kinetic molecular theory of gases; Dalton's gas law; Boyle's gas law; Charles's gas law; Ideal gas law
Liquids and Solids	Intermolecular forces; Phase changes; Vapor pressure; Polarity; Properties
Solutions	Polarity (intermolecular forces); Colligative properties; Concentration calculations
Acids and Bases	pH; Strength; Brønsted-Lowry reactions; Calculations
Kinetics, Thermodynamics, Equilibria	Le Chatelier's principle; Laws of thermodynamics; Enthalpies and entropies; Heat transfer; Activation energy; Half-life
Atomic and Molecular Structure	Electron configuration; Lewis-Dot diagrams; Molecular geometry; Bond types; Sub-atomic particles
Nuclear Reactions	Balancing equations; Decay processes; Particles; Terminology
Laboratory	Basic techniques; Equipment; Error analysis; Safety; Data analysis

Administration of the ATDH

The ATDH is administered via computer at Prometric test centers throughout the US, its territories, and in Canada. Administration occurs during predefined testing windows throughout the year. Table 1 presents the ATDH administration schedule. The total administration time is four hours and 50 minutes (290 minutes), including the tutorial, scheduled breaks, and survey.

Table 1
ATDH Administration Schedule

Section	Items	Minutes
Introduction and Tutorial		15
Reading Comprehension	40	50
Language Usage	40	30
Break (optional)		15
Quantitative Reasoning	40	45
Perceptual Ability	60	45
Break (optional)		15

Biology	30	30
General Chemistry	30	30
Post Examination Survey		15
Total	240	290

The ATDH is administered in separately-timed sections. Once a candidate completes a section, they are not allowed to return to the section to view items and/or change answers. Partial testing is not permitted; candidates are required to take each section of the examination.

Policies and procedures concerning ATDH administration are detailed in the ATDH Candidate Guide, which is published annually. The Candidate Guide is available at ADA.org/ATDH.

In taking the ATDH, candidates agree to adhere to examination rules and regulations, which are described in the ATDH Candidate Guide. Candidate behavior is closely monitored during test administration to confirm that rules and regulations are followed. Candidates who violate examination regulations are subject to severe penalties that include the voiding of scores and the imposition of mandatory wait periods.

Results Reporting

ATDH results are reported electronically approximately five weeks after the close of each administration window. Results are posted to the candidate's My Account page, and sent to the dental hygiene education programs selected on the candidate's ATDH application or indicated in additional score report requests.

Results are provided electronically to all programs selected by the candidate. Beginning with the 2023 American Dental Education Association (ADEA) Dental Hygiene Centralized Application Service (DHCAS) application cycle, if a candidate requests that results be sent to a dental hygiene program, the testing program will also report results to the ADEA DHCAS. This will occur at the same time results are released to the candidate's designated schools and/or programs. At least one dental hygiene program must be selected on the application to have results sent to ADEA DHCAS.

When ATDH results are reported, the candidate's full testing history is reported (i.e., test results for all testing attempts are listed). Once a candidate has taken any part of the ATDH, they cannot request the scores to be voided. In considering a candidate's performance across multiple testing attempts, DTS recommends that programs consider results from the most recent administration, as these should provide the best insight into the candidate's current skills.

ATDH Scale Scores

ATDH results are determined based on a candidate's correct responses to items. Results are reported as scale scores. These scale scores are not raw scores (i.e., the number of correct answers provided by the candidate). The conversion of raw scores to scale scores is accomplished using Item Response Theory procedures. Scale scores enable meaningful comparison of the performance of candidates who have tested using different test forms and at different times. The ATDH Program does not designate specific passing or failing scores.

ATDH scale scores range from 200 to 500. Higher scale scores in a specific area indicate higher cognitive skills in that area. Any test not taken is assigned a score of 200. The following scale scores are reported to ATDH candidates:

- ATDH Overall (Critical thinking in foundational skill areas)
- English Language Skills
- Reading Comprehension
- Language Usage
- Quantitative Reasoning
- Perceptual Ability
- Biology
- General Chemistry

The ATDH Overall score and the English Language Skills score are referred to as composite scores, because they are calculated using scores from other scales (i.e., the discipline-based scales). The ATDH Overall score is an average of scale scores from all six ATDH disciplines: Reading Comprehension, Language Usage, Quantitative Reasoning, Perceptual Ability, Biology, and General Chemistry. The final score is rounded to the nearest ten. The English Language Skills score is an average of scale scores from Reading Comprehension and Language Usage.

During the ATDH's first year of implementation, DTS established the discipline-based ATDH score scales so they each had a mean of approximately 350 and a standard deviation of approximately 50. These scale properties (i.e., mean of 350 and standard deviation of 50) are anticipated to be challenging to maintain over time, due to changes in those who complete the examination. In short, as more and more dental hygiene education programs use the ATDH, the level of skills of the overall candidate pool may shift based on the skills of those included. Programs should anticipate that recalibration of score scales may be necessary in future years, as utilization of the ATDH expands across dental hygiene programs.

Scoring and Equating

Scale scores for the six ATDH disciplines are calculated using the Rasch model (Rasch, 1960, Wright & Stone, 1979). In providing an estimate of candidate skills, the Rasch Model takes into account the difficulty level of each test item. Each administered ATDH form includes items that enable DTS to place scores from different forms of the examination on a common measurement scale, thereby adjusting for any minor differences in form difficulty. Because of this adjustment, ATDH scores have the same meaning regardless of the test form that was administered.

Although the ATDH consists of 240 items in total, some items do not contribute to candidate scores. After the data is collected, items are evaluated statistically, and items that show inadequate statistical performance are withheld from scoring when scores are calculated. Candidates are not able to distinguish between questions which contribute to their score and those that do not.

Score Reliability

Score reliability is an important indicator of examination quality. Test developers strive to ensure test scores provide a stable and precise measurement of a candidate's knowledge, skills, and abilities. Despite efforts to eliminate possible sources of measurement error, random factors can affect candidate performance and subsequent examination results. Reliability indices assess the degree to which random error affects scores. When scores on an examination demonstrate low reliability, they are strongly influenced by random sources of measurement error. Conversely, when scores on an examination demonstrate high reliability, they are less subject to random sources of error. A strategy that is commonly used to increase reliability is to lengthen examinations. Having uniformly high-quality items also contributes to reliability.

Reliability coefficients for ATDH scores are presented in Table 2. Coefficient alpha reliability estimates are provided for the six discipline-based scores (Cronbach, 1951), while composite reliability estimates are provided for the two composite scores (He, 2009). The reliability coefficients can range from zero to one, with higher values indicating higher reliability.

Table 2
Reliability Coefficients for ATDH Scores: 2021
(522 administrations)

ATDH Scale	Reliability
ATDH Overall	.89 to .90
English Language Skills	.76 to .83
Reading Comprehension	.70 to .82
Language Usage	.63 to .67
Quantitative Reasoning	.86
Perceptual Ability	.74 to .81
Biology	.71 to .76
General Chemistry	.65 to .72

The reliability coefficients presented in Table 2 indicate that the ATDH Overall score is a highly reliable indicator of candidate overall skill levels. The English Language Skills composite scores also demonstrate high reliability, with coefficients ranging from .76 to .83 across examination forms. To understand a candidate's English language proficiency, DTS recommends that programs focus on the English Language Skills composite score, which is based on more items, and therefore tends to be more reliable than the individual scores in Reading Comprehension or Language Usage.

Normative Information

ATDH Percentiles

Appendix A presents the percentiles associated with scores on each ATDH scale. The percentiles are based on the 522 ATDH administrations that took place during the ATDH testing window that spanned from September 1 through October 31, 2021. For each scale score, the corresponding percentile can be interpreted as the percentage of ATDH candidates who

achieved that scale score or lower. If a given scale score corresponds to a percentile of 88, for example, then 88% of ATDH candidates achieved that score or a lower score.

Descriptive Statistics for ATDH Scale Scores

Descriptive statistics for ATDH scale scores are provided in Table 3. The descriptive statistics are similarly based on the 522 ATDH administrations that took place during the ATDH testing window that spanned from September 1 through October 31, 2021. As noted previously, ATDH scale scores can range from 200 to 500.

Table 3
Descriptive Statistics for ATDH Scale Scores: 2021
(522 administrations)

Scale Type	Scale	Mean	SD	Min	Max
Composite	ATDH Overall	350.6	36.2	250	480
	English Language Skills	351.9	42.8	210	500
Discipline	Reading Comprehension	349.6	48.0	200	500
	Language Usage	349.8	50.0	210	490
	Quantitative Reasoning	349.5	48.4	230	500
	Perceptual Ability	350.0	49.6	200	500
	Biology	349.5	48.2	200	500
	General Chemistry	349.0	46.8	200	500

Frequency distributions for ATDH scale scores are presented in Appendices B1 through B8. The horizontal axis of each figure shows the range of possible ATDH scale scores (200 to 500) and the vertical axis shows the number of times each scale score was observed. Scale score means and standard deviations are also included within the figures.

Additional Guidelines for Interpreting ATDH Results

The following guidelines may be helpful for interpreting ATDH results and corresponding normative information:

- Over time, dental hygiene programs will become more familiar with ATDH results, and develop an understanding of the cognitive skills associated with the various ATDH score levels. In the initial years of ATDH administration, while programs are still developing this understanding, it is recommended that ATDH results be interpreted on a relative basis, as follows:
 - Candidates with higher scores on each scale have demonstrated stronger cognitive skills than candidates obtaining lower scores.
- When utilizing the percentiles in Appendix A, programs should be mindful of the fact that, strictly speaking, percentiles obtained across ATDH testing windows (i.e., across norm groups) are NOT directly comparable with regard to the level of skills represented at each percentile level. Comparison of relative performance using percentiles within ATDH testing windows (within a given norm group) is useful and appropriate.

- Candidates' percentile standings can and will change across ATDH testing windows, even though a given candidate's performance on the examination remains the same. This is also why ATDH results are reported as scale scores, which do not change and have the potential to take on fixed interpretations (i.e., a score of 'x' signifies a specific level of cognitive skills with respect to a particular discipline of interest).
- When examining and comparing candidate performance, programs should use caution when interpreting differences in percentile standing. Differences in percentile standing communicate differences in candidate relative standing in the sample tested, NOT the size or magnitude of the difference between candidates in their level of underlying skills. For example, assuming the data are normally distributed, a five percent (5%) difference in percentile standing could correspond to:
 - A small difference in skills for candidates who fall in the middle of the distribution (e.g., 50th percentile).
 - A large difference in skills for candidates scoring in the tails of a distribution (e.g., 95th percentile).
- Use percentiles to understand candidates' relative standing within the sample tested.
- Use scale scores to understand candidate skill levels, as well as differences between candidates in the level of their underlying skills.
- The ATDH Overall score provides a highly reliable estimate of a candidate's overall skill level. DTS recommends that programs use the ATDH Overall score to understand a candidate's overall critical thinking skills, as applied to the disciplines covered on the examination.
- To understand a candidate's English language proficiency, DTS recommends that programs focus on the English Language Skills composite score. This score is based on more items and therefore tends to be more reliable than the individual scores provided for Reading Comprehension and Language Usage.
- DTS recommends that programs NOT simply rank order candidates and make selection decisions based on a top-down approach. This approach may disadvantage certain applicant groups.
- Candidates may choose to take the examination more than once. Because the ATDH is a new examination, and many candidates are experiencing it for the first time, it is recommended that programs reference the candidate's most recent results to best represent the candidate's skills.
- As a reminder, in making admission decisions programs should carefully consider the full set of Knowledge, Skills, Abilities, and Other characteristics (KSAOs) that contribute to candidate success and have been identified as important to a program, in relation to program, school, and legal requirements and the qualifications of candidates.
- Programs should let the above perspective help inform their decisions with respect to individual candidates.

Concluding Thoughts

The ATDH was developed at the request of those within the dental hygiene community, based on perceived needs within this community. The ATDH has been specifically designed for use by dental hygiene programs to identify candidates who have the greatest likelihood of success. The ADA appreciates the opportunity to share the ATDH with the dental hygiene community, providing this community with a professional developed, valid, reliable, and fair examination that can help inform dental hygiene program admission decisions.

References

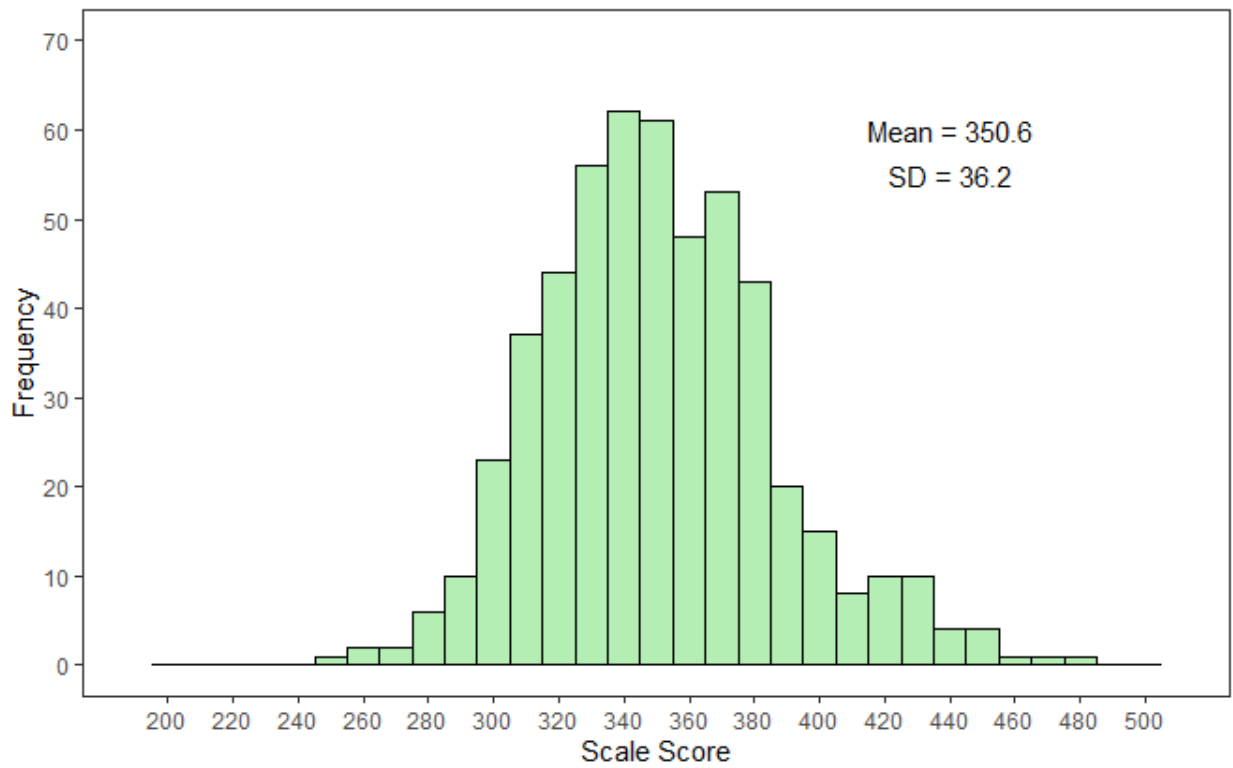
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Appendix A – Percentiles Associated with ATDH Scale Scores: 2021
(522 Administrations)

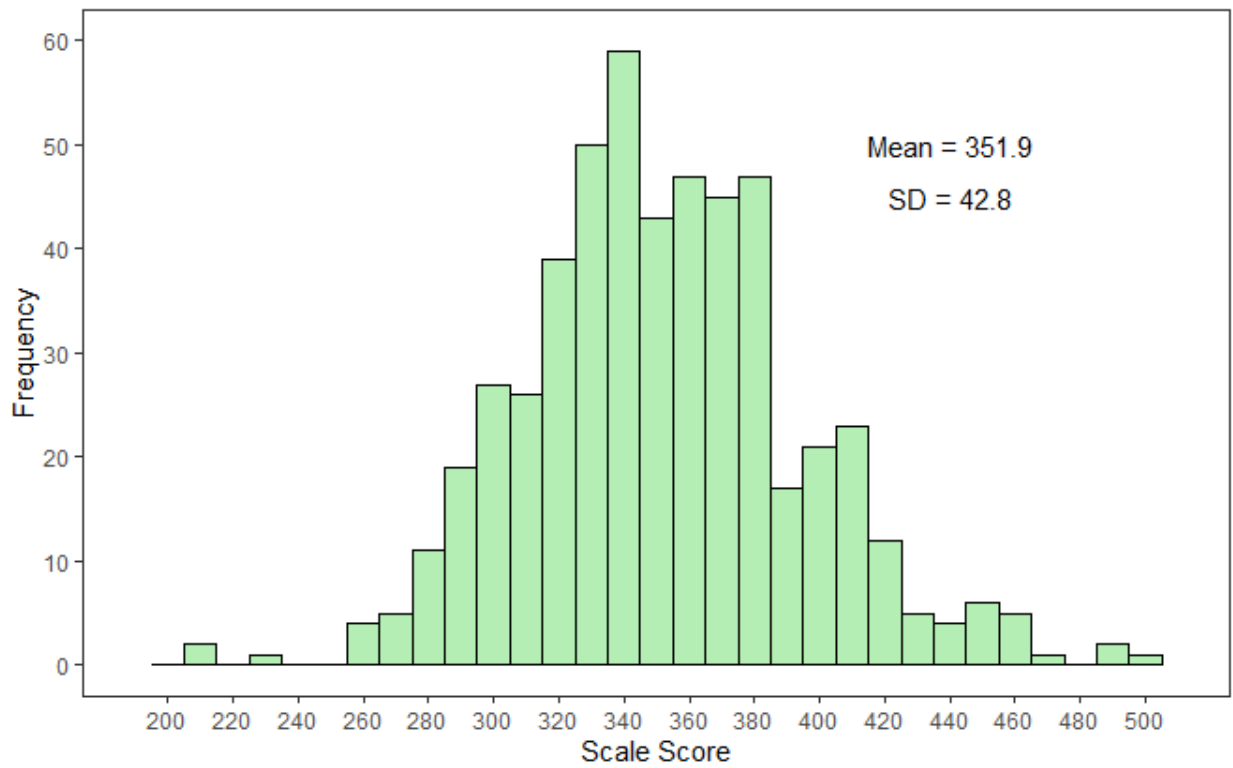
ATDH = ATDH Overall; **ELS** = English Language Skills; **RCT** = Reading Comprehension;
LU = Language Usage; **QRT** = Quantitative Reasoning; **PAT** = Perceptual Ability;
BIO = Biology; **GEN** = General Chemistry

Scale Score	ATDH	ELS	RCT	LU	QRT	PAT	BIO	GEN
500		99	99		99	99	99	99
490		99	99	99	99	99	99	99
480	99	99	98	99	99	99	98	99
470	99	99	98	99	99	99	98	98
460	99	99	98	99	99	99	98	98
450	99	98	98	99	99	98	96	97
440	99	97	97	99	95	96	96	97
430	98	96	96	97	95	94	95	96
420	96	95	94	97	93	93	93	94
410	94	93	92	97	90	90	92	93
400	93	89	89	89	88	88	89	89
390	90	85	86	85	84	82	87	85
380	86	81	79	85	80	78	82	80
370	78	72	71	75	77	69	76	77
360	67	64	67	65	67	65	68	69
350	58	55	59	59	61	57	57	61
340	47	47	46	49	54	46	47	50
330	35	35	37	43	43	39	37	40
320	24	26	30	31	35	31	30	30
310	16	18	25	22	26	22	23	20
300	8	13	17	19	15	19	18	15
290	4	8	11	14	9	14	11	10
280	2	4	7	7	5	9	7	6
270	1	2	5	4	3	6	4	6
260	1	1	3	3	1	3	3	3
250	1	1	2	1	1	2	1	3
240		1	1	1	1	1	1	2
230		1	1	1	1	1	1	2
220		1	1	1		1	1	2
210		1	1	1		1	1	2
200			1			1	1	1

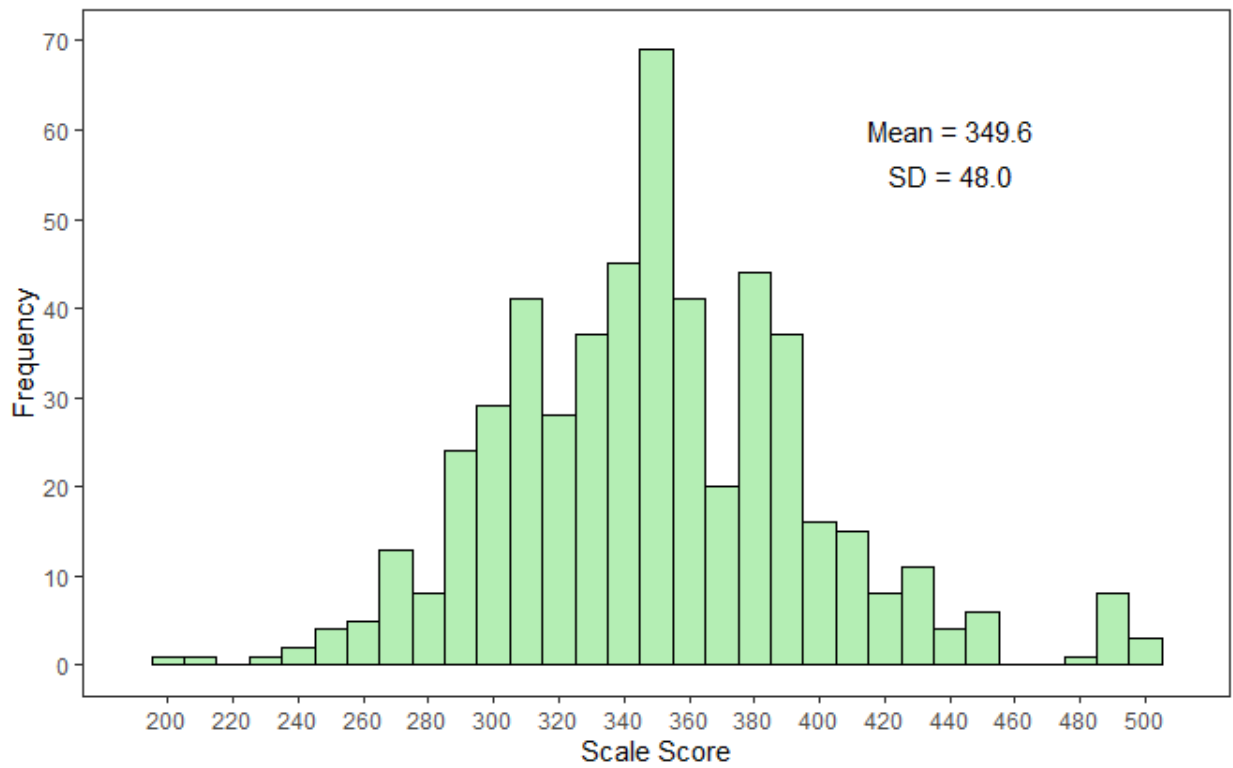
Appendix B1 – Frequency Distribution for ADHD Overall Scores: 2021
(522 Administrations)



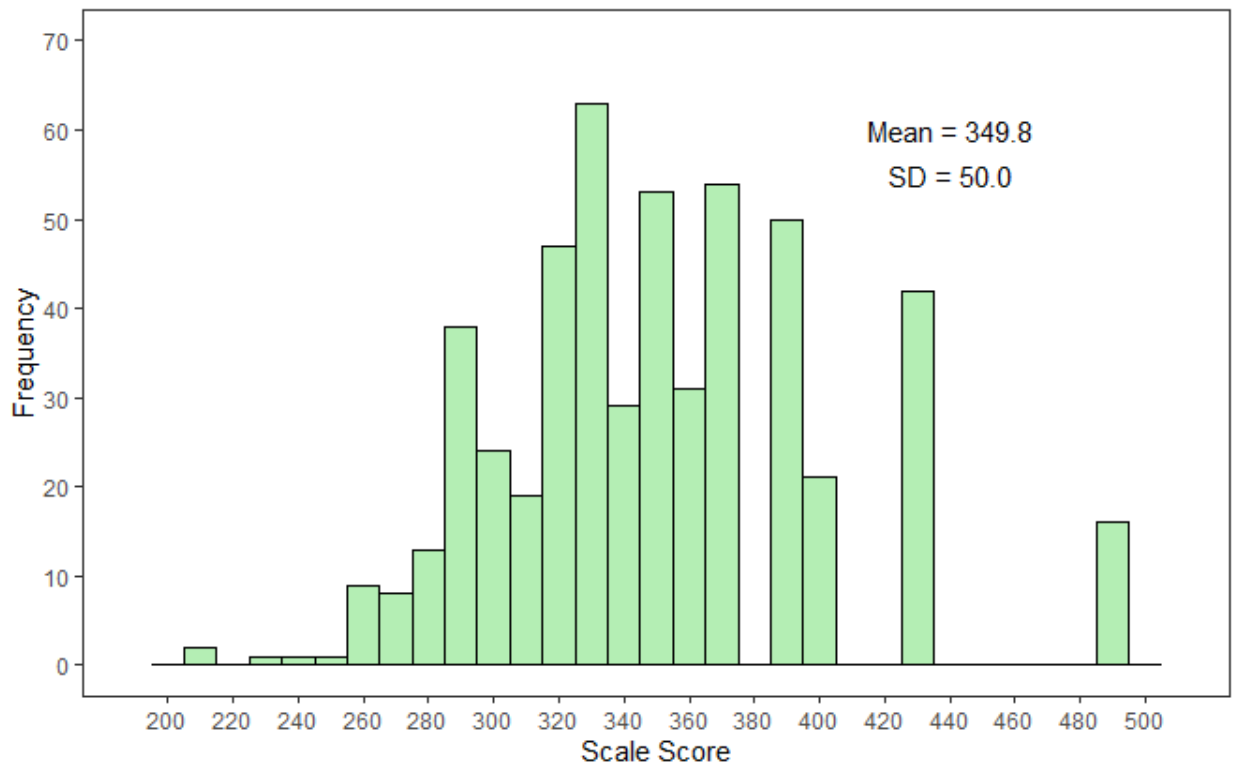
Appendix B2 – Frequency Distribution for English Language Skills Scores: 2021
(522 Administrations)



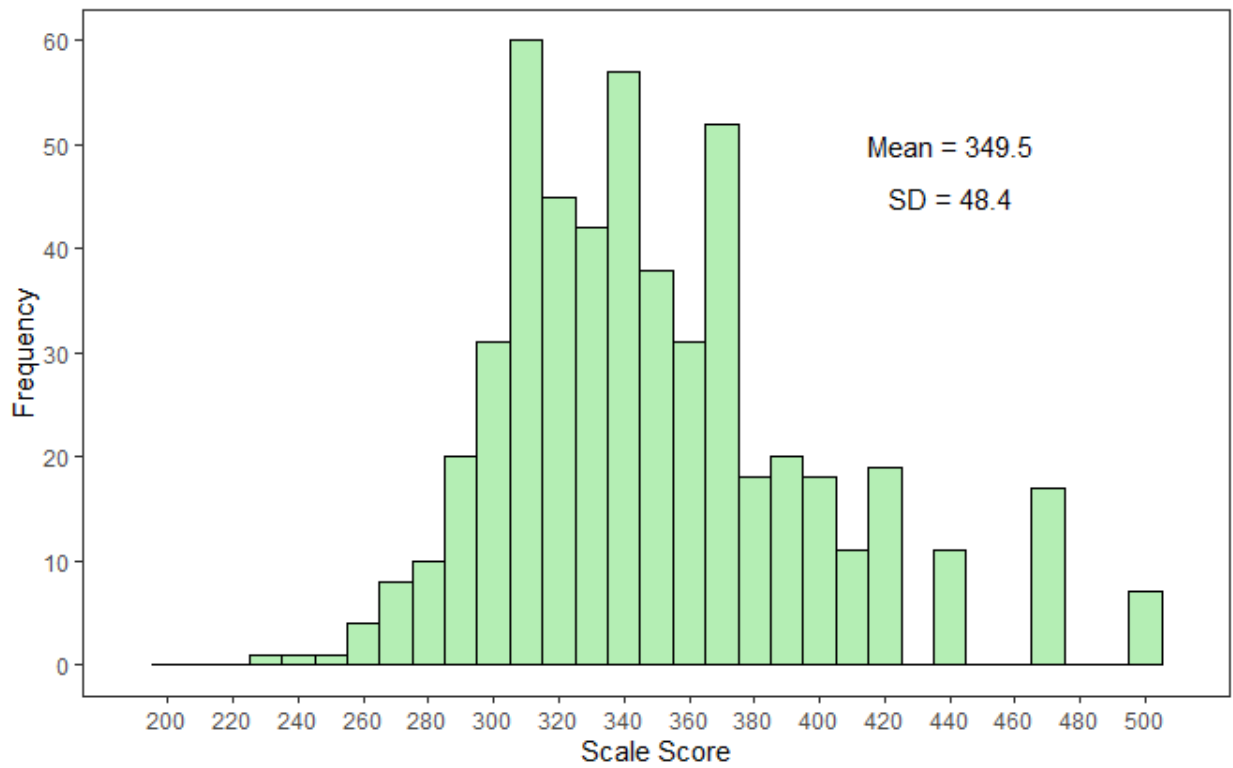
Appendix B3 – Frequency Distribution for Reading Comprehension Scores: 2021
(522 Administrations)



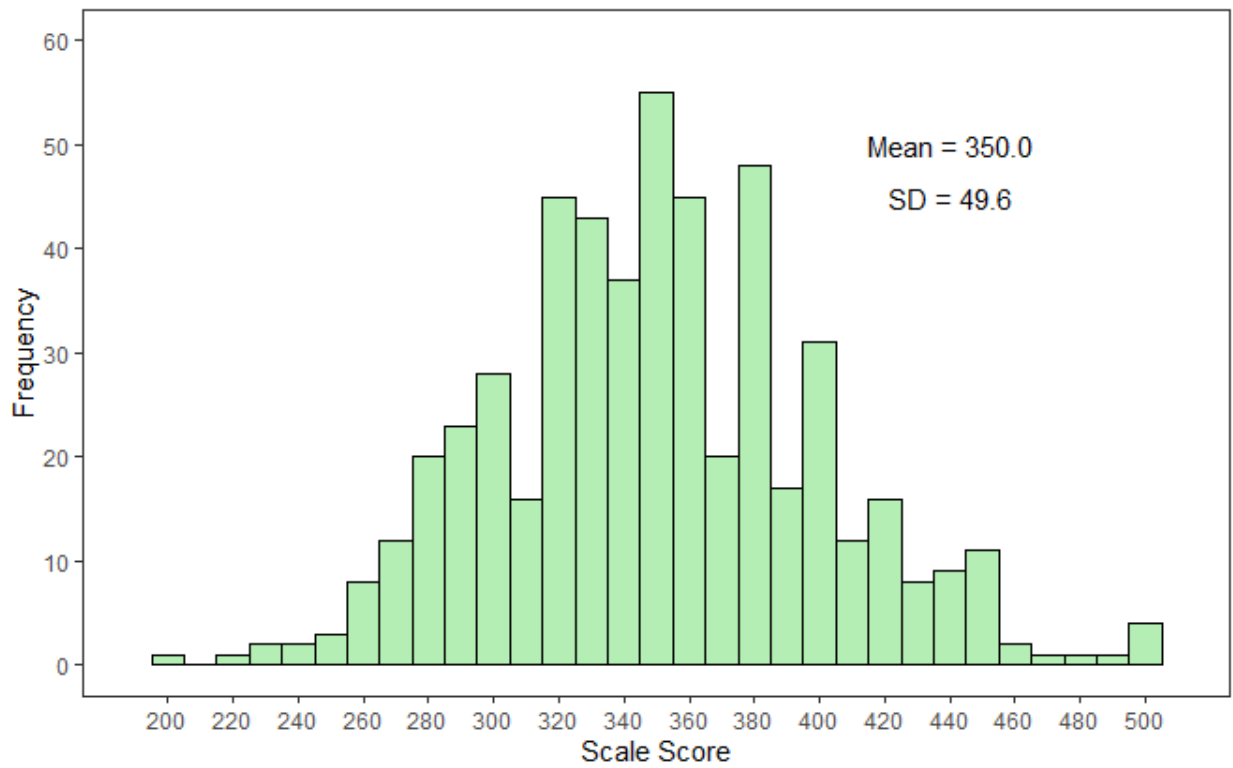
Appendix B4 – Frequency Distribution for Language Usage Scores: 2021
(522 Administrations)



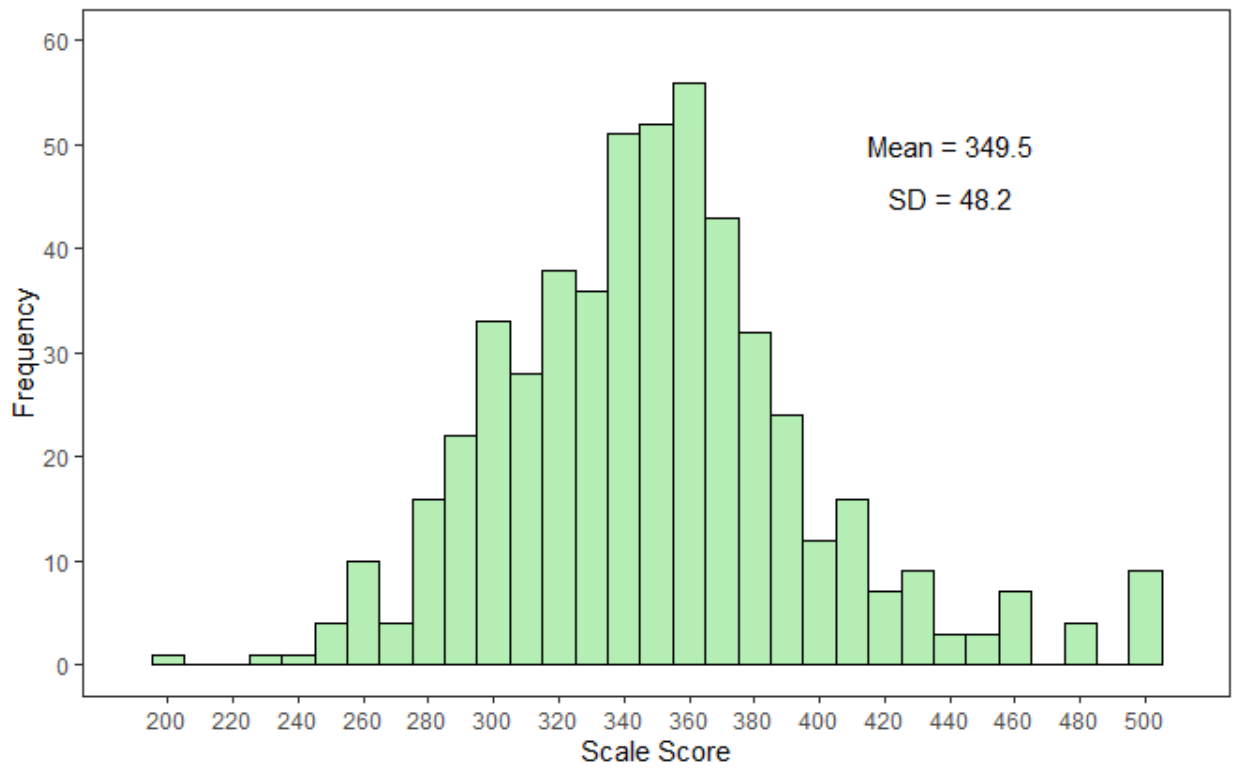
Appendix B5 – Frequency Distribution for Quantitative Reasoning Scores: 2021
(522 Administrations)



Appendix B6 – Frequency Distribution for Perceptual Ability Scores: 2021
(522 Administrations)



Appendix B7 – Frequency Distribution for Biology Scores: 2021
(522 Administrations)



Appendix B8 – Frequency Distribution for General Chemistry Scores: 2021
(522 Administrations)

