

# **Effect of attitudes toward study, study behaviors, and use of study aids on successful completion of the certifying examination of the American College of Theriogenologists**

Margaret V. Root Kustritz

College of Veterinary Medicine, University of Minnesota, St. Paul, MN

## **Abstract**

Candidates who had taken the certifying examination of the American College of Theriogenologists within the previous ten years were surveyed. Data were collected regarding attitudes toward study, self-directed study behaviors, and use of study aids including textbooks, journal articles, websites, list-serves, and group study. Study attitudes varied slightly between successful and unsuccessful candidates, with successful candidates more likely to strive for perfection on all tasks and unsuccessful candidates more likely to view completion of the examination necessary for future success. Successful candidates exhibited more self-directed study behaviors and to a greater extent than did unsuccessful candidates. The most commonly used study aids are described.

**Keywords:** Education, examination, study aids

## **Introduction**

Reproductive endocrinology, obstetrics, gynecology, andrology, neonatology, and advanced reproductive technologies comprise the discipline of theriogenology in veterinary medicine. To be certified as a specialist in theriogenology, a candidate must be a graduate veterinarian and complete either one year of clinical experience followed by a two to three year residency in theriogenology or complete a mentored program of study while in clinical practice. At the culmination of training, candidates must pass a comprehensive examination evaluating all aspects of theriogenology in all domestic animal species.

Overall pass rate on the certifying examination averages 56.8%, with 80.7% of candidates passing on their first try.<sup>1</sup> The examination is offered annually and failure to pass in a given year is associated with monetary expense if the examination is taken subsequently and may be associated with inability of unsuccessful candidates to progress in their career if board certification is a requirement of employment or promotion. Statistical analysis of parameters of the certifying examination from 2000 to 2008 revealed no correlation between success on the examination and route of preparation or species focus, suggesting that extent and type of preparation are what determine success on the examination.<sup>1</sup>

There is evidence in the literature correlating self-regulatory behaviors with higher test scores in high school and college courses.<sup>2,3</sup> These behaviors are self-generated and are the thoughts, feelings, and actions necessary for attainment of goals.<sup>4</sup> Self-regulated students actively participate in their own learning by altering the environment and their behavior to promote cognitive processes.<sup>3,5</sup> Examples of successful self-regulatory study behaviors include goal setting and planning, keeping records and monitoring progress, rehearsing verbally and in writing, transforming and reorganizing information, and rewarding oneself for completion of tasks.<sup>2</sup> Self-regulation also includes self-awareness of when to access outside assistance.<sup>6</sup> The strongest correlations between test scores and self-regulatory behaviors are for time management and creation of a study environment.<sup>7</sup>

Motivation can be described as a combination of attainment value, the inherent drive a candidate has to succeed; interest value, the enjoyment one gets from working toward the goal; and utility value, the knowledge that achievement of the goal will enhance one's life or career.<sup>8</sup> The hypothesis is that those who successfully complete the certifying examination of the American College of Theriogenologists (ACT) exhibit more self-regulatory behaviors and higher attainment value, interest value, and utility value than those who are not successful.

## Materials and methods

All candidates of the certifying examination for the last ten years were offered a survey assessing self-regulatory behaviors and motivation (survey 1), and a separate survey documenting study aids used (survey 2). The survey was available electronically and all results were anonymous. Candidates were contacted by email.

Survey 1 asked candidates to rate attainment value, interest value, and utility value, respectively, by evaluating statements about their desire for perfection, how much they enjoyed studying for the examination, and how much it would benefit them to successfully complete the examination. The scale used was 0 = statements were not at all true, 1 = statements were somewhat true, 2 = statements were true, and 3 = statement were very true. Candidates also were asked to rate on a scale from 1 = rarely to 5 = commonly their use of time management, creation of a specific study environment, seeking of outside assistance, goal setting and planning, keeping records and monitoring, rehearsing and memorizing, organizing and transforming, and positive self-consequences.

Survey 2 asked candidates how they had used various study aids, including textbooks, journal articles, proceedings, websites, and list-serves. Finally, candidates were asked how they had changed their study habits if they had taken the examination more than once, and were asked for general comments.

## Results

Survey requests were sent to 135 candidates. Thirty-two responded to survey 1 and 45 respondents completed survey 2. Some individuals completed both surveys.

Survey 1 was completed by 27 candidates who passed the certifying examination and five candidates who did not. Of the 27 who passed, 19 passed on their first try, five on the second try, and three on the third try.

Attainment value was assessed with the statement, "As a person, I strive to complete every task I undertake as perfectly as possible." Successful candidates rated this as true while unsuccessful candidates rated it slightly lower, with mean scores of 2.0 and 1.6, respectively. Interest value was assessed within the statement, "I enjoyed preparing for the American College of Theriogenologists certifying examination." Successful candidates and unsuccessful candidates both rated this as somewhat true, with mean scores of 1.3 and 1.4, respectively. Utility value was assessed with the statement, "I see great value in passing the American College of Theriogenologists certifying examination as a means of helping me achieve future career goals." Successful candidates rated this slightly lower than unsuccessful candidates, with mean scores of 2.1 and 2.4, respectively; both groups considered it to be a true statement.

Successful candidates used all self-regulatory behaviors to a greater extent than unsuccessful candidates and were much more likely to consciously use time management (Table 1). For both groups, creation of a dedicated study space was used frequently. Other significant behaviors used by successful candidates included time management, goal setting and planning, and organizing and transforming.

Survey 2 evaluated use of various study aids. Textbooks were used by all respondents, with 82.6% reading and taking notes on entire texts or chapters. This was commonly described as useful for creation of study aids that were then used repeatedly over the study period. Texts most commonly used were those providing a broad knowledge base (Appendix 1). Journal articles were used by all respondents, with 91.4% reading and reviewing select articles with written or oral discussion. Articles were chosen as support for clinical cases seen, to promote better understanding of material read in textbooks, or as part of a faculty-led journal club. Commonly used journals were those specific to reproduction (Appendix 2). Proceedings were used by all respondents, with 73.9% reading selected articles or abstracts. The proceedings most commonly used were those from the Society for Theriogenology annual meeting and from species-specific practitioner organizations (Appendix 3).

Websites were used by 80.0% of respondents. A few candidates had taken specific board preparation courses. Most used websites to read compiled notes or view compiled images (Appendix 4). List-serves were used by 48.5% of respondents. Candidates were equally likely to read questions from a list-serve and not respond or to read and respond to a question with subsequent grading. A small

percentage (7.9%) of respondents used list-serve questions to promote peer study. List-serves used most commonly were those supported by the ACT for board preparation and the Society for Theriogenology for species-specific case discussions. No respondents reported use of Ning, Facebook, or other participatory sites for sharing of discussion and documents.

Finally, face to face meetings for small group study were used by 58.7% of respondents, with most participating as residents in training at their own institutions. Guided courses of study offered at the institution, including courses in the DVM curriculum and specific graduate courses, were described as valuable. Sample test questions were used by some groups, with some timed to better mimic the actual examination. Participation in group meetings promoted timely review of materials and ensured discussion of topics and species outside the candidate's comfort zone. No respondents reported use of Skype or other participatory sites for virtual group meetings.

Specific suggestions from candidates to promote successful completion of the certifying examination included finding a study partner or group with which to study; ensuring dedicated time for study, as much as six to eight weeks just prior to the examination if possible; reading and seeing cases as much as possible; preparation of study notes and guides for ongoing review; reviewing material in multiple formats including reading texts and answering questions; and consideration of taking an intermediate examination, such as the Australian College of Veterinary Scientists Membership examination. Other suggestions included flunking the examination once so you knew what to expect, prayer, and beer.

## **Discussion**

Successful candidates employed all types of self-regulatory study behaviors to a greater extent than did unsuccessful candidates. This is in agreement with previous work, in which it was demonstrated that successful candidates scored higher on all portions of the examination and in all species than did unsuccessful candidates, suggesting there is no replacement for broad and deep preparation for the certifying examination.<sup>1</sup> Attainment value did vary somewhat between the two groups, with the successful candidates more likely to agree with the statement that they strive for perfection than those in the unsuccessful group. Neither group had great interest value. Surprisingly, the unsuccessful candidates agreed more strongly with the statement of utility value; this may be because they are still striving to reach this goal or because the successful candidates have not realized all they had hoped after successfully completing the examination.

## **Conclusion**

The most important things a candidate can do to prepare for the certifying examination of the ACT are setting aside time specific for study; creating a study environment with minimal distractions; reading and organizing material from relevant texts, journal articles, and proceedings; using websites judiciously for review of images and other materials, and setting specific goals. The ACT can help candidates by supporting appropriate residency training programs and mentorships, continuing to provide list-serves for board preparation and case-based discussions, and perhaps helping to create study groups for face-to-face or virtual meetings and journal clubs.

## **References**

1. Root Kustritz MV, Kastelic J: Statistical analysis of the certifying examination of the American College of Theriogenologists, [www.theriogenology.org/associations/2753/files/Statistical%20analysis%20of%20the%20certifying%20examination%20of%20the%20ACT%201.20.09%20FINAL.doc](http://www.theriogenology.org/associations/2753/files/Statistical%20analysis%20of%20the%20certifying%20examination%20of%20the%20ACT%201.20.09%20FINAL.doc), accessed 05-10-10.
2. Kitsantas A: Test preparation and performance: a self-regulatory analysis. *J Exptl Educ* 2002;70:101-113.
3. Judd JS, Bail FT: Secondary students' strategies and achievement. *Acad Exch Quarterly* 2006;10:116-120.
4. Zimmerman BJ: Attaining self-regulation: a social cognitive perspective. In: Bockaerts M, Pintrich P, Seidner M, editors. *Self-regulation: theory, research and applications*. Orlando (FL): Academic Press; 2002. p. 13-39.
5. Bandura A: *Self-efficacy: The exercise of control*. New York: WH Freeman; 1997.
6. Orange C. Using peer modeling to teach self-regulation. *J Exptl Educ* 1999;68:21-39.

7. Kitsantas A, Winsler A, Huie F: Self-regulation and ability predictors of academic success during college: a predictive validity study. *J Adv Acad* 2008;20:42-68.
8. Eccles JS: Subjective task value and the Eccles et al model of achievement-related choices. In: Elliot AJ, Dweck CS, editors. *Handbook of competence and motivation*. New York: Guilford; 2005. p. 105-121.

Table 1. Use of self-regulatory study behaviors by successful and unsuccessful candidates

| SELF-REGULATORY BEHAVIOR   | SUCCESSFUL CANDIDATE MEAN SCORE * | UNSUCCESSFUL CANDIDATE MEAN SCORE |
|--|-----------------------------------|-----------------------------------|
| Time management = specific setting of time limits devoted to study                         | 4.1                               | 2.2                               |
| Study environment = creation and maintenance of dedicated study space without distractions | 4.0                               | 3.2                               |
| Seeking info and help = specific requests for assistance from social and academic contacts | 3.4                               | 2.4                               |
| Goal setting and planning = setting strategic goals and planning study activities          | 3.9                               | 2.8                               |
| Keeping records and monitoring = maintaining records of study progress                     | 2.7                               | 2.0                               |
| Rehearsing and memorizing = engaging in overt practice in written or verbal format         | 3.3                               | 2.6                               |
| Organizing and transforming = reorganizing material from lectures, texts, or other sources | 3.7                               | 2.8                               |
| Self-consequencing = rewarding oneself for task completion                                 | 2.4                               | 1.4                               |

\* 1 = never used, 2 = rarely, 3 = occasionally, 4 = regularly, 5 = commonly

APPENDIX 1: Textbooks most commonly used by candidates taking the ACT certifying examination

- 1) *Current Therapy in Large Animal Theriogenology*, 2nd edition. Youngquist RS, Threlfall W, editors. St. Louis: WB Saunders; 2007.
- 2) *Canine and Feline Theriogenology*. Johnston SD, Root Kustritz MV, Olson PN. Philadelphia: WB Saunders; 2001.
- 3) *Pathways to Pregnancy and Parturition*. Senger PL. Pullman (WA): Current Conceptions; 2005. *Best used early in preparation to lay groundwork*
- 4) *Equine Reproduction*. McKinnon AO, Voss JL, editors. Ames (IA): Wiley-Blackwell; 2003.
- 5) *Current Therapy in Equine Reproduction*. Samper JC, Pycocock J, McKinnon AO, editors. Philadelphia: WB Saunders; 2006.
- 6) *Manual of Equine Reproduction*, 3rd edition. Brinsko SP, Blanchard TL, Varner DD, et al. St. Louis: Mosby; 2010.
- 7) *Color Atlas of Reproductive Pathology*. Buegelt CD. St. Louis: Mosby; 1997.
- 8) *Veterinary Obstetrics and Genital Diseases – Theriogenology*, 3rd edition. Roberts SJ. Woodstock (VT): Published by the author; 1986.
- 9) *Canine and Feline Endocrinology and Reproduction*, 3rd edition. Feldman CE, Nelson RW. Philadelphia; WB Saunders: 2003.

APPENDIX 2: Journals most commonly used by candidates taking the ACT certifying examination

- 1) Theriogenology
- 2) Animal Reproduction Science
- 3) Veterinary Clinics of North America - Small Animal, Food Animal, and Equine Practice

APPENDIX 3: Proceedings most commonly used by candidates taking the ACT certifying examination

- 1) Society for Theriogenology annual meeting
- 2) American Association of Equine Practitioners
- 3) American Association of Bovine Practitioners
- 4) American Association of Swine Practitioners
- 5) International meetings – European College of Animal Reproduction (ECAR), International Congress on Animal Reproduction (ICAR), World Small Animal Veterinary Association (WSAVA)

APPENDIX 4: Websites most commonly used by candidates taking the ACT certifying examination

- 1) Drost project – [www.drostproject.org](http://www.drostproject.org)
- 2) Cornell pathology – [w3.vet.cornell.edu/nst/](http://w3.vet.cornell.edu/nst/)
- 3) University websites – Colorado State University, Louisiana State University, University of California-Davis, University of Florida, University of Minnesota
- 4) International Veterinary Information Service – [www.ivis.org](http://www.ivis.org)

