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DISCUSSION/REVIEW

An Annotated Bibliography of Verbal Behavior Articles Published Outside of *The Analysis of Verbal Behavior*: 2015

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Abstract An annotated bibliography is provided that summarizes journal articles on verbal behavior published outside of *The Analysis of Verbal Behavior* in 2015, the primary journal for scholarship in this area. Thirty such articles were identified and annotated as a resource for practitioners, researchers, and educators.

Keywords Annotated bibliography · Language · Verbal behavior

An annotated bibliography is a list of references to scholarly publications with a brief description of each. Annotated bibliographies serve as resources for researchers, educators, and practitioners and represent an efficient way to identify relevant literature on a particular topic. Carr, Nosik, Lechago, and Phillips (2015) published the first annotated bibliography of journal articles about verbal behavior published outside of *The Analysis of Verbal Behavior* journal. The present article is the second annual iteration of this project and includes journal articles published in 2015. We used identical search procedures to those described in Carr et al., which yielded 30 articles. The most apparent theme among this body of articles was a focus on emergent language, which appeared in 63 % of the articles. The most common sources of articles in the bibliography were *Journal of Applied Behavior Analysis* (6 articles, 20 %), *The Psychological Record* (5 articles, 16.7 %), and *Research in Autism Spectrum Disorders* (5 articles 16.7 %). The annotated bibliography for 2015 appears below.

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Annotated Bibliography

1. Belloso-Díaz, C., & Pérez-González, L. A. (2015). Effect of learning tacts or tacts and intraverbals on the emergence of intraverbals about verbal categorization. *The Psychological Record*, *65*, 749–760.

   The intraverbal is a verbal operant influenced by a verbal stimulus with which it is formally similar but has no point-to-point correspondence. Intraverbal responding is implicated in the establishment of many skills including academic tasks, social interactions, and problem-solving. The authors conducted two experiments. In experiment 1, multiple-tact training resulted in the emergence of intraverbal responding. In experiment 2, tact training and intraverbal training also resulted in the emergence of intraverbal responding. The slightly superior results in experiment 1 were discussed in terms of the discriminative control of verbal and visual stimuli.
2. Belloso-Díaz, C., & Pérez-González, L. A. (2015). Exemplars and categories necessary for the emergence of intraverbals about transitive reasoning in typically developing children. *The Psychological Record*, *65*, 541–556.

   Categorization training is an important part of a teaching curriculum. Tactics to increase the efficiency of categorization training are warranted due to the resource-intensive nature of educational and clinical environments. The authors of this study found that direct training of both the category intraverbal relation and of the exemplar intraverbal relation was superior to the direct training of the exemplar intraverbal relation alone in producing emergence of intraverbal relations.
3. Boudreau, B. A., Vladescu, J. C., Kodak, T. M., Argott, P. J., & Kisamore, A. N. (2015). A comparison of differential reinforcement procedures with children with autism. *Journal of Applied Behavior Analysis*, *48*, 918–923.

   Previous research on the effectiveness of differential reinforcement on skill acquisition has compared reinforcement quality and reinforcement schedules, has explored differences in magnitude of reinforcement delivered, and has directly compared the effects of reinforcement schedules and magnitude. This was the first study to directly compare reinforcement magnitude, reinforcement quality, and nondifferential reinforcement as differential reinforcement manipulations. Results demonstrated the most rapid tact acquisition occurred in all three conditions (one participant per condition), indicating the importance of individualizing reinforcement delivery procedures.
4. Carnerero, J. J., & Pérez-González, L. A. (2015). Emergence of naming relations and intraverbals after auditory stimulus pairing. *The Psychological Record*, *65*, 509–522.

   The authors explored the effects of exposing typically developing adults to an auditory pairing procedure on the emergence of tact, listener, and intraverbal responding. They were also interested in whether pairing sequences would affect emergent responding and found that it was influential. The authors found that intraverbals that required category names were acquired faster compared to intraverbals that required exemplar names. The mechanisms of action were interpreted according to the naming theory.
5. Carp, C. L., & Petursdottir, A. I. (2015). Intraverbal naming and equivalence class formation in children. *Journal of the Experimental Analysis of Behavior*, *104*, 223–240.

While there is empirical evidence to support the establishment of equivalence relations without the use of verbal mediation, it may be possible that verbal mediation facilitates the establishment of these relations. In the current study, the authors conducted equivalence training using visual stimuli and tact training using arbitrary names for each stimulus. They then conducted posttraining probes of intraverbal responding, an experimentally novel approach to assessing the role of mediating verbal behavior in the formation of equivalence relations. The results showed a relationship between accurate performance with transitivity trials and emergent intraverbal relations. The authors offered a number of conceptual interpretations of these outcomes.

6. Choi, J., Greer, R. D., & Keohane, D. (2015). The effects of an auditory match-to-sample procedure on listener literacy and echoic responses. *Behavioral Development Bulletin*, *20*, 186–206.

   The authors discuss the importance of listener responding, identifying it as a behavioral cusp. Listener literacy, defined as an individual responding accurately to the sounds of other speakers, was the focus if the investigation. The results of this study demonstrated the efficacy of a computerized match-to-sample (MTS) task in increasing listener literacy, echoic responding, and preferences for a variety of adult voices in six children with autism spectrum disorder (ASD) and one child with attention-deficit/hyperactivity disorder.

7. Daar, J. H., Negrelli, S., & Dixon, M. R. (2015). Derived emergence of WH question–answers in children with autism. *Research in Autism Spectrum Disorders*, *19*, 59–71.

   The authors described the contributions of Relational Frame Theory and the theory of stimulus equivalence to our understanding of how individuals learn to respond to WH questions. These theories highlight derived relational responding, defined as our learning to respond to one stimulus in relation to another stimulus. Results of the study demonstrated the efficacy of conditional discrimination training between community associations, noun type, and WH questions in establishing accurate responding to novel WH question for 2 of 3 participants with ASD.

8. Dickes, N. R., & Kodak, T. (2015). Evaluating the emergence of reverse intraverbals following intraverbal training in young children with autism spectrum disorder. *Behavioral Interventions*, *30*, 169–190.

   Intraverbal responding is critical to success across multiple skill domains (e.g., academic and social). Although there is empirical support for using transfer of stimulus control procedures for teaching intraverbal responding to individuals with ASD, continued investigation is warranted for teaching learners to respond using reverse or bidirectional intraverbals. The results of this study demonstrated that training original intraverbals was sufficient to produce emergence of reverse intraverbals and that the direct training of reverse intraverbals was not necessary. These outcomes are inconsistent with other literature on this topic. The authors articulated a few points addressing the possible reasons for these differences in their results.

9. Dixon, M., Belisle, J., Stanley, C., Rowsey, K., Daar, J., & Szekely, S. (2015). Toward a behavior analysis of complex language for children with autism: Evaluating the relationship between PEAK and the VB-MAPP. *Journal of Developmental & Physical Disabilities*, *27*, 223–233.

ASD is characterized by significant deficits in verbal behavior. Therefore, the assessment and teaching of verbal behavior is germane to many ASD treatment programs. The Verbal Behavior Milestones and Placement Program (VB-MAPP) (Sundberg, 2008) is a verbal behavior assessment tool based on Skinner's (1957) analysis of verbal behavior. The authors of this study used a logarithmic regression model to compare the effectiveness of the VB-MAPP to a recently published assessment tool—*Promoting the Emergence of Advanced Knowledge Relational Training System* (PEAK) (Dixon, Belisle, Whiting & Rowsey, 2014)—using 20 children, adolescents, and young adults diagnosed with ASD. The results suggest that the PEAK and VB-MAPP are comparable with respect to assessing the basic verbal operants (e.g., mands and tacts), but that the PEAK is superior with respect to the assessment of more complex verbal behavior (e.g., generalized responding). The authors discuss the implications of these outcomes as they pertain to treatment assessment and planning, and propose future directions for research related to the analysis of assessment measures.

10. Elias, N. C., & Goyos, C. (2015). The effects of teaching sign-video and action-video conditional discriminations in the emergence of symmetry and tacts with children. *Behavior Analysis*: *Research and Practice*, *15*, 81–89.

    The authors extended the MTS literature by examining the effects of using a video of someone demonstrating a sign as a sample stimulus and action videos as comparison stimuli on the emergence of sign tacts (tacting the action in the presence of the video clips). Some advantages of using computerized and video presentations during the MTS procedure included increased treatment integrity, automaticity of the trial presentation and data collection, and increased variability in types of stimuli presented (e.g., video clips, text, pictures). Results demonstrated the efficacy of the computerized MTS procedure and use of video clips in establishing conditional discriminations using signs.

11. Golfeto, R. M., & De Souza, D. G. (2015). Sentence production after listener and echoic training by prelingual deaf children with cochlear implants. *Journal of Applied Behavior Analysis*, *48*, 363–375.

    A cochlear implant is a small electronic device that is partially surgically implanted to assist profoundly deaf and severely hard-of-hearing individuals to detect auditory stimuli. In pre-linguistic individuals, cochlear implants help amplify auditory stimuli but they do not result in discrimination of those stimuli. The authors examined the effects of an MTS preparation using video and dictated sentences in conjunction with matrix training to establish listener and speaker skills. MTS training was effective in establishing auditory conditional discriminations. Tacting also emerged after MTS training, demonstrating the efficacy of this procedure in establishing auditory discriminations in pre-linguistic individuals with profound hearing loss.

12. Greer, R. D., & Du, L. (2015). Experience and the onset of the capability to learn names incidentally by exclusion. *The Psychological Record*, *65*, 355–373.

    The current study explores naming, defined as a higher-order operant wherein an individual relates to a stimulus both as a speaker and as a listener. The authors introduce a concept termed exclusion by naming (EN), which is when an individual is able to learn object-word relations incidentally for a novel stimulus by hearing the word for the stimulus when they are able to tact the rest of the

stimuli that are present. The results of the study demonstrated the efficacy of exclusionary multiple-exemplar instruction in teaching typically developing children to acquire EN.

13. Guerrero, M., Alós, F. J., & Moriana, J. A. (2015). Emergent relations with compound stimuli in conditional and simple discriminations: An experimental application in children. *The Psychological Record*, *65*, 475–486.

    The authors explored the effectiveness of simple discrimination training in comparison to conditional discrimination training on the emergence of conditional discriminations and intraverbal relations. The authors found simple discrimination training to be particularly effective when training using compound stimuli. The results of this study contribute to the literature exploring the effects of training sequences (speaker before listener versus listener before speaker training) on rate and accuracy of skill acquisition.

14. Haq, S. S., & Kodak, T. (2015). Evaluating the effects of massed and distributed practice on acquisition and maintenance of tacts and textual behavior with typically developing children. *Journal of Applied Behavior Analysis*, *48*, 85–95.

    Massed practice involves practicing skills in a concentrated session of learning and distributed practice involves dividing practice opportunities across multiple learning sessions. The respective effectiveness of each learning format has implications with respect to curricular planning in the classroom and other structured learning environments. Outcomes demonstrated distributed practice to be superior to massed practice with respect to the number of training trials and sessions required, the amount of time required to teach, and the number of student errors.

15. Haq, S. S., Kodak, T., Kurtz-Nelson, E., Porritt, M., Rush, K., & Cariveau, T. (2015). Comparing the effects of massed and distributed practice on skill acquisition for children with autism. *Journal of Applied Behavior Analysis*, *48*, 454–459.

    Previous research has identified distributed practice to be superior to massed practice in teaching typically developing children. The present study also demonstrated the superiority of the distributed practice format in teaching tacts and textual and intraverbal behavior to children with ASD, which has implications for curricular planning in the classroom and during clinical training sessions.

16. Howarth, M., Dudek, J., & Greer, R. D. (2015). Establishing derived relations for stimulus equivalence in children with severe cognitive and language delays. *European Journal of Behavior Analysis*, *16*, 49–81.

    The authors endeavored to identify the necessary skills to establish conditional discriminations in children with profound verbal behavior deficits. The results of a series of four experiments suggested that the establishment of the symmetrical relation and tacting are critical to establishing stimulus equivalence. The authors describe the contributions of these outcomes to theory and practical application.

17. Kelly, L., & Holloway, J. (2015). An investigation of the effectiveness of behavioral momentum on the acquisition and fluency outcomes of tacts in three children with autism spectrum disorder. *Research in Autism Spectrum Disorders*, *9*, 182–192.

    The authors examined the effectiveness of a behavioral momentum (BM) procedure during tact training, specifically focusing on accuracy of responding (acquisition), maintenance (retention), generalization of responding (application),

endurance, and correct responding in the presence of competing contingencies (stability). The results suggest that BM was successful in producing fluency (i.e., accuracy + speed) during tact training.

18. Lee, G. P., Miguel, C. F., Darcey, E. K., & Jennings, A. M. (2015). A further evaluation of the effects of listener training on derived categorization and speaker behavior in children with autism. *Research in Autism Spectrum Disorders*, *9*, 72–81.

    The naming theory suggests that categorization, or class formation, requires that an individual be able to relate to a stimulus as both a speaker and as a listener. The authors of the current study conducted standardized language tests to assess speaker and listener repertoires prior to training. They then examined the effects of category listener training on the emergence of category tacting and categorization by matching visual stimuli. The results demonstrate that when a learner is able to name, listener categorization training alone can result in emergence of tact and visual categorization responding.

19. Lorah, E., Karnes, A., & Speight, D. (2015). The acquisition of intraverbal responding using a speech generating device in school aged children with autism. *Journal of Developmental & Physical Disabilities*, *27*, 557–568.

    Approximately 30 % of individuals with a diagnosis of ASD do not engage in vocal-verbal behavior. Advancements in technology have led to the development of augmentative and alternative communication (AAC) systems, like picture-exchange systems and computer tablets. The results of the study demonstrate the effectiveness of using a 5-s time delay and physical prompts to teach two children with ASD to emit intraverbal responses using an iPad® and the Proloqu2Go™ application. These findings extend the literature on AAC and verbal behavior training by providing preliminary evidence for effectiveness of these communication systems to teach verbal behavior targets beyond the basic mand to nonvocal learners.

20. Martins, L. A., Hübner, M. M., Gomes, F. P., Portugal, M. P., & Treu, K. E. (2015). Effect of the qualifying autoclitic "is" in conditional discrimination training and equivalence tests. *Acta Colombiana de Psicología*, *18*, 37–46.

    MTS procedures have been demonstrated to effectively establish conditional discriminations. In this study, the authors examined whether an autoclitic response, specifically the qualifying autoclitic "is," would have facilitative effects on the establishment of conditional discriminations. In the instructions provided to the control group, the participants were told to match shapes by clicking on them and that they would hear applause and receive a token for a correct match. In the instructions provided to the treatment group, the participants were told that they had to make a statement, "This *figure* is the *other figure*," while they matched figures, and that they would hear applause and receive a token only if the match was correct and if they made the "is" statement. The results demonstrate that the autoclitic "is" response did not improve responding.

21. McKeel, A. N., Rowsey, K. E., Belisle, J., Dixon, M. R., & Szekely, S. (2015). Teaching complex verbal operants with the PEAK relational training system. *Behavior Analysis in Practice*, *8*, 241–244.

    The PEAK assessment was designed to assess both Skinner's basic verbal operants (echoics, tacts) and more complex forms of verbal behavior. The

outcomes of this study support the effectiveness of the PEAK for assessing and teaching complex responding, specifically guessing, autoclitics, metonymical tacts, and tacting planet names in three children diagnosed with an ASD.

22. McKeel, A., Rowsey, K., Dixon, M. R., & Daar, J. H. (2015). Correlation between PEAK relational training system and one-word picture vocabulary tests. *Research in Autism Spectrum Disorders*, *12*, 34–39.

    The psychometrics of the PEAK were evaluated. Results of the PEAK were compared to results obtained from two well-established receptive and expressive language assessments (ROWPVT-4 and EOWPVT-4). The results demonstrated a strong correlation between the outcomes of the PEAK and the outcomes of these two assessments.

23. Miguel, C. F., Frampton, S. E., Lantaya, C. A., LaFrance, D. L., Quah, K., Meyer, C. S., Elias, N. C., & Fernand, J. K. (2015). The effects of tact training on the development of analogical reasoning. *Journal of the Experimental Analysis of Behavior*, *104*, 96–118.

    The authors examine analogical reasoning using a verbal behavior approach, which defines analogical reasoning as responding under the discriminative control of the relation between two stimuli. In a series of four experiments, the authors examined the effects of relational tact training using compound stimuli on the emergence of vocal responding to the compound stimuli, visual-visual conditional discrimination using an MTS task to assess formation of relational classes (same, different), and an MTS task to assess selection of the individual components of compound stimuli to determine formation of equivalence classes. Results support the efficacy of simple discrimination training of the individual components of compound stimuli and relational tact training (same, different) in establishing analogical reasoning.

24. Pence, S. T., & St. Peter, C. C. (2015). Evaluation of treatment integrity errors on mand acquisition. *Journal of Applied Behavior Analysis*, *48*, 575–589.

    Caregivers and other professionals who are less experienced with ABA may not always implement mand training with high integrity. The authors of this study examined four levels of treatment integrity (0, 40, 70, and 100 %) in two separate experiments to determine at what point treatment integrity failures would impair learning. In the first experiment, they examined the effects of the delivery of the incorrect item, and in the second experiment, they examined the effects of response-independent delivery of the item. The results support the practices of the delivery of the correct item and response-contingent reinforcer delivery as critical to successful mand training.

25. Peters, L. C., & Thompson, R. H. (2015). Teaching children with autism to respond to conversation partners' interest. *Journal of Applied Behavior Analysis*, *48*, 544–562.

    The usefulness of behavioral skills training (BST) has been demonstrated across populations and skills. This study examined the efficacy of BST to teach children with ASD to respond appropriately to expressions of nonvocal disinterest in a conversation partner. Outcomes demonstrated the effectiveness of BST in teaching responding with questions and conversation topic changes when a conversation partner expresses nonvocal disinterest. Additionally, BST and extinction were both demonstrated to produce variability in response type.

26. Petursdottir, A. I., Carp, C. L., Peterson, S. P., & Lepper, T. L. (2015). Emergence of visual-visual conditional discriminations. *Journal of the Experimental Analysis of Behavior*, *103*, 332–348.

Identifying the mechanisms of action responsible for emergent conditional discriminations is of great practical and theoretical importance. The authors examined the effects of tact and intraverbal training on the emergence of visual-visual conditional discrimination responding, which was assessed using an MTS task. Half of the participants passed the MTS test. Most of those that passed the MTS test were unable to emit the reverse intraverbal responses, challenging assumptions related to the naming theory interpretation of emergent conditional discrimination. The authors describe possible interpretations of the outcomes through the lenses of naming theory, stimulus equivalence, and joint control.

27. Ribeiro, D. M., Miguel, C. F., & Goyos, C. (2015). The effects of listener training on discriminative control by elements of compound stimuli in children with disabilities. *Journal of the Experimental Analysis of Behavior*, *104*, 48–62.

Overselectivity, or restricted stimulus control, occurs when a subset of features of a compound stimulus comes to influence responding, which can subsequently hinder learning across a variety of skill domains (e.g., academic, social, verbal behavior). This study examined the effectiveness and efficiency of listener training using compound stimuli on the emergence of listener and speaker responding related to new compound stimuli and component properties of compound stimuli. Results of this study support the importance of establishing bidirectional responding, learning to respond as both a listener and a speaker, in influencing emergent responding.

28. Rowsey, K., Belisle, J., & Dixon, M. (2015). Principal component analysis of the PEAK relational training system. *Journal of Developmental & Physical Disabilities*, *27*, 15–23.

Statistical analyses were used to identify four primary factors that underlie the PEAK assessment: (1) foundational learning skills (e.g., basic motor, social, and vocal skills); (2) perceptual learning skills (e.g., simple vocabulary and language skills and advanced imitation skills); (3) verbal comprehension skills (e.g., writing, reading, and additional basic verbal skills); and (4) verbal reasoning, memory, and mathematical skills (e.g., reading comprehension, math and money, and advanced verbal skills). The authors indicate that PEAK's conceptual interpretation may enhance communication with disciplines outside of the field of behavior analysis and advance our understanding of what constitutes "intelligence."

29. Still, K., Mayb, R. J., Rehfeldt, R. A., Whelan, R., & Dymond, S. (2015). Facilitating derived requesting skills with a touchscreen tablet computer for children with autism spectrum disorder. *Research in Autism Spectrum Disorders*, *9*, 44–58.

The authors sought to examine the effects of conditional discrimination training to see if it would result in the production of untrained mands, referred to as derived relational manding. Additionally, they sought to extend the literature on derived relational responding by including children diagnosed with ASD, who had significantly impaired speaker and listener responding. The authors taught the participants to use a touch tablet to exchange pictures of items for the item itself. Participants then learned to relate the dictated names of the items to the

corresponding pictures of the items (A-B) and to relate the dictated names to the corresponding printed words (A-C) using the touchscreen tablet computer. Test probes were conducted to determine whether the participants would mand for the missing items using text rather than pictures. The authors were able to successfully establish derived manding using the touch tablet for 10 out of the 11 participants.

30. Wilson, A. N., & Dixon, M. R. (2015). Derived rule tacting and subsequent following by slot machine players. *The Psychological Record*, *65*, 13–21.

The authors endeavored to identify the effects of derived rule tacting on subsequent gambling behavior. Initially, playing with red or silver coins did not impact the programmed contingencies of the slot machines. Conditional discrimination training was then conducted to establish red or silver coins as "better." Participants generated a self-rule describing one coin color as superior to the other, and for 5 of the 6 participants, their gambling behavior conformed to the rule. Results of this study contribute to our theoretical understanding of the generation of self-rules and rule-following behavior.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

References

Carr, J. E., Nosik, M. R., Lechago, S. A., & Phillips, L. (2015). An annotated bibliography of verbal behavior scholarship published outside of *The Analysis of Verbal Behavior*: 2014. *The Analysis of Verbal Behavior, 31*, 3–9. doi:10.1007/s40616-015-0029-z.

Dixon, M. R., Belisle, J., Whiting, S. W., & Rowsey, K. E. (2014). Normative sample of the PEAK relational training system: direct training module and subsequent comparisons to individuals with autism. *Research in Autism Spectrum Disorders, 8*, 1597–1606. doi:10.1016/j.rasd.2014.07.020.

Skinner, B. F. (1957). *Verbal behavior*. Englewood Cliffs: Prentice Hall.

Sundberg, M. L. (2008). *VB-MAPP: verbal behavior milestones assessment and placement program*. Concord: AVB Press.