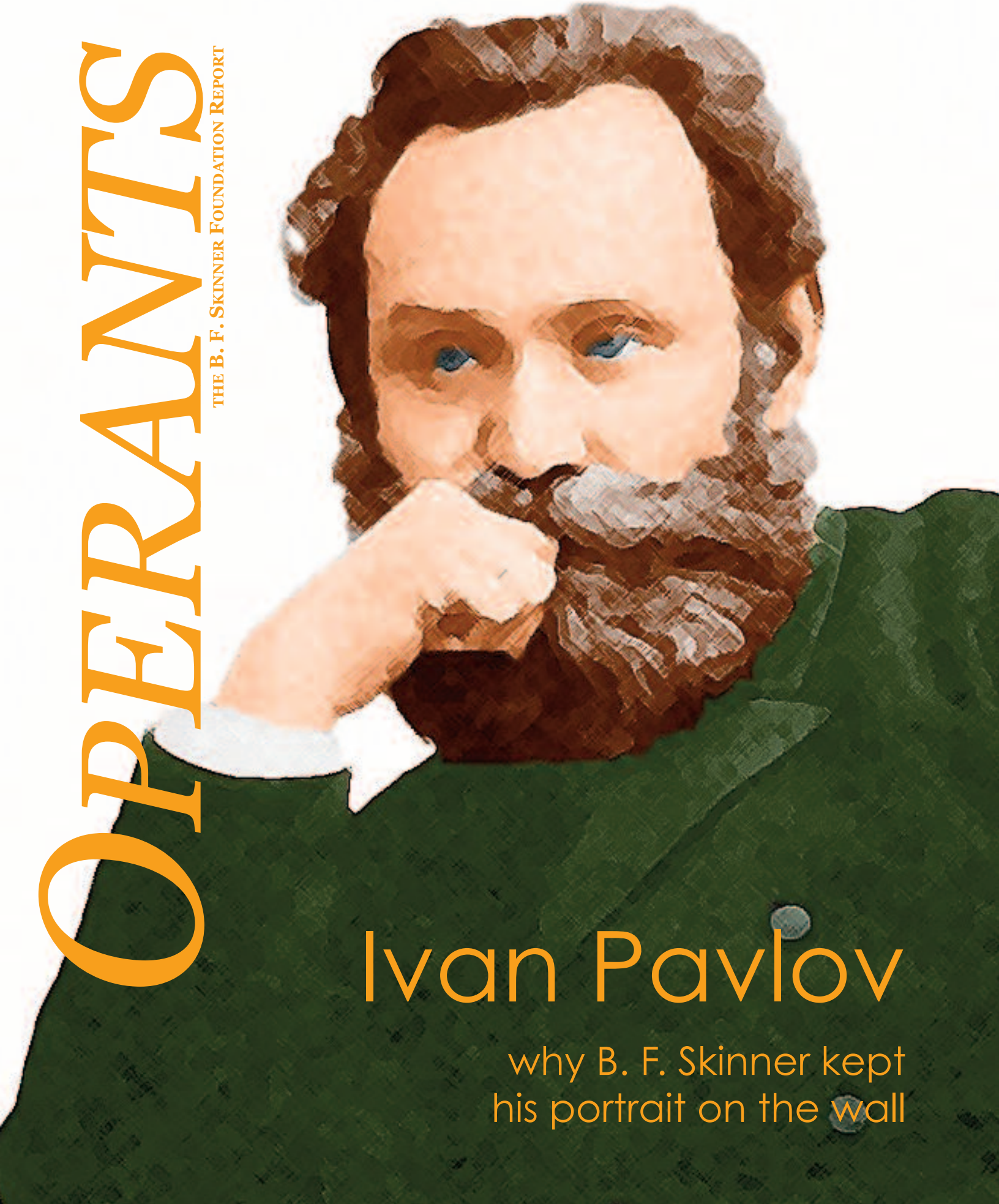
Quarter III, 2015

Operants

The B. F. Skinner Foundation Report



Ivan Pavlov

why B. F. Skinner kept his portrait on the wall

from the president

It is said that when you solve one problem in science, a dozen more problems appear. The Foundation seems to function like that. For each completed project, dozens of other things to do occur. Here are three future projects the Foundation would like to do:

> Create an on-line B. F. Skinner virtual museum. One "room" would be a tour of his study. Another could show things he built, like a lamp from an rusty stove grate, or toys he made for his children. Additional "rooms' would illustrate other aspects of Skinner's life with photos, articles, and videos.
>
> Reprint Skinner's autobiography in an on-line or eBook enhanced version. Photos and relevant audio or video sections would be included. Links that identify people, places, or topics mentioned would help readers.
>
> Put Holland and Skinner's *The Analysis of Behavior* on line. The book consists of programmed instruction that would work well in an individualized interactive format.

We have many more ideas for the Foundation to better serve the behavioral community. Of course, all projects require funding. The Foundation has received grants and financial assistance from institutions, but we also count on individual support for project activities. Many thanks to those of you who have already made contributions. We invite the rest of our readers to sign up on our website for monthly donations. $10 a month contribution from every subscriber would allow us to complete all these and many other projects.

Julie S. Vargas, Ph.D.
President, B. F. Skinner Foundation

from the president

Chinese Traditional Translated by Sue Shu-Hwei Ke

據說，當您解決一個科學的問題時，更多的問題將會出現。基金會似乎也有著相同的功能，每一個計劃完成的同時，也確實出現更多其他事件。這裡有三個未來計畫是基金會想要執行的:

- 成立一個線上B.F. Skinner虛擬博物館，其中一個展覽室會是他的學習之旅，另一個展覽室會展現他的創作作品。例如，使用生鏽爐門製作成的一盞燈，或他為孩子製作的玩具。其他的展覽室則會透過相片、文章、和錄影帶展現Skinner的其他生活面向。
- 重新印製Skinner的自傳於線上或電子書加強版，並包含相片和相關的語音或視頻。針對所提到的人物、地點，或主題提供鏈接，以幫助讀者閱讀。
- 線上發表Holland 和Skinner的行為分析。此書包含設計好的程序可提供一個更合適的個別化互動模式。

我們有許多的想法能讓基金會提供更好的服務給行為社區。當然，所有的計劃都需要資金。基金會雖已獲得來自機構的補助金和財政支援，我們的活動計畫也仍需要仰賴個人的支持。非常感謝已經做出貢獻的你們。我們在此邀請其餘的讀者，能夠在我們的網頁註冊並每個月貢獻。即使是一個月10 美元，來自所有讀者的貢獻將讓這些計畫變得可能。

Chinese Simplified Translated by Libby Cheng

據說，當您解決了科學上的一個問題後，有更多的科學會問題陸續出現。基金會的作用似乎與這說法一致。對於每一個完成的項目，其他的事情確實會陸續出現。以下是基金會三個未來的發展項目：

•為B.F.Skinner創建一個虛擬的網路博物館。他所做的研究會被收藏在其中一個“房間”裏被瀏覽的人參觀。另一個"房間"會展示他的創作，如一個用生鏽爐篦做的燈，又或是他為子女所建造的玩具。

還有一個“房間”會存放 B.F. Skinner 的生活照片、文章以及影片去描述 B.F. Skinner 其他方面的生活。

•把Skinner的自傳重新編印在互聯網或電子書籍上，並傳放他的照片和相關的音頻或視頻片段以製作自傳的加強版。讀者亦可透過互聯網上的連接去辨識自傳中相關的人物、地點或主題。

•把Holland和Skinner的行為分析（The Analysis of Behavior) 一書上載於互聯網上。全書以程式作指令，以互動的模式讓瀏覽者可作個人化的設定。

我們有更多的主意可以令基金會更有效地服務行為學這業界。 然而，所有項目都需要資金。雖然基金會已收到不同機構的捐款以及財政援助，但我們也希望得到更多個人捐贈的支持。 非常感謝那些已經作出捐贈的人。請其餘的讀者們能花少許時間，到我們的網站註冊成月捐貢獻人。如果每個用戶也提供每月十元的捐獻，以上的項目將會加快實現。

French Translated by MarieCelina Clemenceau

En matière de Science, on dit que lorsqu’on résoud un problème, une douzaine d'autres apparaissent. La Fondation semble fonctionner comme ça. Pour chaque projet terminé, des dizaines d'autres choses à faire émergent. Voici trois futurs projets que la Fondation aimerait réaliser:

- Créer un musée virtuel BF Skinner, en ligne. Une "pièce" présenterait un tour de son étude. Une autre pourrait montrer des choses qu'il a construites, comme une lampe à partir d'une grille rouillée de gazinière, ou des jouets qu'il a fait pour ses enfants. « Des pièces supplémentaires » illustreraient d'autres aspects de la vie de Skinner avec des photos, des articles et des vidéos.
- Réimprimer l'autobiographie de Skinner dans une version améliorée en ligne ou eBook. Des photos, des sections audio ou vidéo pertinentes seraient inclus. Des liens pour identifier les personnes, les lieux, ou des sujets mentionnés aiderait lecteurs.
- Mettre The Analysis of Behavior de Hollande et Skinner en ligne. Le livre présente l'enseignement programmé qui fonctionnerait bien dans un format interactif individualisé.

Nous avons encore davantage d'idées pour la Fondation afin de mieux servir la communauté comportementale. Bien sûr, tous les projets nécessitent des financements. La Fondation a reçu des subventions et aides financières des institutions, mais nous comptons également sur le soutien individuel pour les activités du projet. Un grand merci à ceux d'entre vous qui ont déjà apporté leurs contributions. Nous invitons le reste de nos lecteurs à s’inscrire sur notre site Web pour des dons mensuels. Ne serait-ce qu’une contribution de 10 $ par mois de la part de tous les abonnés rendrait ces projets possibles.

Greek Translated by Anna Plessa

Λένε πως μόλις λύσεις ένα επιστημονικό πρόβλημα, εμφανίζονται άλλα δέκα. Το ίδρυμά μας λειτουργεί κι αυτό κάπως έτσι. Με κάθε πρότζεκτ που κλείνει, βρίσκουμε ένα σωρό άλλα πράγματα που πρέπει να γίνουν. Σας παρουσιάζουμε τρία μελλοντικά πρότζεκτ που θα θέλαμε να φέρουμε σε πέρας στο Ίδρυμα:

- Δημιουργία εικονικού μουσείου B. F. Skinner online. Θα έχει ένα «δωμάτιο» που θα ξεναγεί τον επισκέπτη στο έργο του. Ένα άλλο θα μπορούσε να δείχνει πράγματα που έφτιαχνε, όπως μια λάμπα φτιαγμένη από το σκουριασμένο στεφάνι ενός ματιού κουζίνας ή τα παιχνίδια που έφτιαχνε για τα παιδιά του. Άλλα «δωμάτια» θα ήταν εκθέσεις γύρω από τη ζωή του Σκίνερ, όπως φωτογραφίες, άρθρα, βίντεο.
- Επανέκδοση της αυτοβιογραφίας του Σκίνερ σε μορφή e-book ή on line. Εκεί μπορούν να περιληφθούν τμήματα με φωτογραφίες ή και βίντεο. Μπορούν επίσης να περιέχονται link για πρόσωπα, μέρη και θέματα που αναφέρονται, ώστε να βοηθιούνται περισσότερο οι αναγνώστες.
- Να βάλουμε online την «Ανάλυση της Συμπεριφοράς» των Holland και Skinner. Το βιβλίο αυτό αποτελεί ένα πρόγραμμα διδασκαλίας που θα δούλευε καλά σε εξατομικευμένη διαδραστική μορφή.

Έχουμε κι άλλες πολλές ιδέες ώστε το Ίδρυμα να υπηρετήσει καλύτερα την κοινότητα των συμπεριφοριστών. Φυσικά κάθε πρότζεκτ θα απαιτήσει χρηματοδότηση. Το Ίδρυμα έχει λάβει επιχορηγήσεις και οικονομική ενίσχυση από άλλα ιδρύματα, αλλά στηριζόμαστε και στην προσωπική σας στήριξη για τα πρότζεκτ μας. Θέλουμε να ευχαριστήσουμε πολύ όσους από εσάς έχετε ήδη προσφέρει τη συνεισφορά σας. Προσκαλούμε όλους τους υπόλοιπους να εγγραφείτε σε πρόγραμμα μηνιαίων δωρεών στο website μας. Ακόμη και μια συνεισφορά της τάξης των 10 δολαρίων από κάθε συνδρομητή θα μας επιτρέψει να πραγματοποιήσουμε τα πρότζεκτ μας.

from the president

Fillipino Translated by Michael Abarca

Nasasabing kapag nakalutas ng problema sa agham, dose-dosenang karagdagang problema ang lilitaw. Para sa bawat proyektong natapos, dose-dosenang iba pang mga bagay-bagay ang dapat nanamang atupagin. Narito ang tatlong mga proyekto sa hinaharap na nais gawin ng Kawang Gawa.

- Lumikha ng onlayn birtwal na museo ni B.F. Skinner. Ang isang “kwarto” ay magsisilbing pasyalan para sa kanyang mga pag-aaral. Ang isa naman ay magpapakita ng mga bagay na kanyang nilikha tulad na lamang ng isang lamapara na gawa sa makalawang na parilya ng kalan o mga laruan para sa mga bata. Ang mga karagdagang “kwarto” ay maglalathala ng ibang mga aspeto pa sa buhay ni Skinner gamit ang mga larawan, artikulo, o bidyo.
- Imprentahing muli ang talambuhay ni B.F. Skinner sa pinagandang bersyon sa onlayn o e-book. Isasama din ang seksyon para sa mga larawan at mahahalagang odyo o bidyo. Ang mga link na magtuturo para mahanap ang mga tao, lugar, o paksa ay makakatulong sa mga mambabasa.
- Ilagay ang The Analysis of Behavior nina Holland at Skinner sa onlayn. Ang aklat ay maglalaman ng naprogramang instruksyon na gagana sa pang-isahang interaktib na ayos.

Madami pa kaming naiisip para sa Kawang Gawa upang lalong matulungan ang komunidad na ngumangasiwa sa pang-uugali. At syempre, lahat ng proyekto ay may kaakibat na pagpopondo. Ang Kawang Gawa ay nakatanggap ng pamigay at tulong-pinansyal galing sa mga institusyon ngunit kami ay umaasa din sa suporta ng bawat isa para sa mga proyekto. Maraming salamat sa mga umambag na. Inaanyayahan pa ang iba naming mga mambabasa upang pumirma sa aming websayt para sa mga buwanang donasyon. Magiging possible ang mga ganitong proyekto kahit lamang sa $10 donasyon buwan buwan.

Hebrew Translated by Shiri Ayvazo

אומרים שכאשר אתה פותר בעיה מדעית אחת, שניים עשר בעיות נוספות צצות. נראה כי הקרן פועלת כך. על כל תוכנית אחת שהושלמה, עולים שניים עשר דברים אחרים לעשות. הנה שלושה מיזמים שהקרן מעוניינת להקים:

- יצירת מוזיאון וירטואלי מקוון של ב. פ. סקינר. "חדר" אחד יהווה סיור אחר המחקר שלו. חדר אחר יכול להראות את הדברים שהוא בנה, כמו מנורה מסורג כיריים חלוד, או צעצועים שהכין לילדיו. "חדרים" נוספים ימחישו היבטים אחרים מחייו של סקינר באמצעות תמונות, כתבות וסרטי וידאו.
- הדפסה מחודשת של האוטוביוגרפיה של סקינר בגרסה משופרת מקוונת או בספר אלקטרוני. תמונות וקטעי שמע וסרטי וידאו רלוונטיים יהיו כלולים. חיבורים המזהים אנשים, מקומות או נושאים מוזכרים יסייעו לקוראים.
- העלאת ניתוח התנהגות של סקינר והולנד לגרסה מקוונת. הספר מכיל הוראה מתוכננת שיכולה לעבוד היטב במבנה אישי אינטראקטיבי.

יש לנו רעיונות רבים נוספים לקרן שישרתו את הקהילה ההתנהגותית. כמובן שכל התוכניות דורשות מימון. הקרן קיבלה מענקים וסיוע כספי ממוסדות, אך אנחנו גם סומכים על תמיכה אישית לפעילויות המיזמים. תודות רבות לאלו מכם שכבר תרמו. אנו מזמינים את יתר הקוראים שלנו להירשם באתר האינטרנט שלנו לתרומות חודשיות. אפילו תרומה של 10 דולרים בחודש מכל הרשומים יהפכו את היוזמות הללו לאפשריות.

Italian Translated by Anna Luzi

Si dice che, nel campo della scienza, per un problema risolto se ne presentano almeno una dozzina di nuovi. La Fondazione sembra funzionare così. Per ogni progetto completato, vi sono decine di stimoli diversi da cogliere. Qui sotto presentiamo tre progetti che la Fondazione vorrebbe intraprendere in futuro:

- Creare un museo virtuale on-line dedicato a BF Skinner. Una "stanza" sarebbe costituita da una visita all’interno del suo studio. Un’altra potrebbe ospitare gli oggetti che ha costruito, come una lampada fatta con la grata arrugginita di una stufa, o i giocattoli che ha realizzato per i suoi figli. In ulteriori “stanze" potrebbero essere illustrati altri aspetti della vita di Skinner con foto, articoli e video.
- Ristampare una versione migliorata dell’autobiografia di Skinner, in forma on-line o come eBook, in cui includere foto e sezioni audio o video rilevanti. I lettori sarebbero aiutati da collegamenti che identifichino le persone e i luoghi, o che approfondiscano specifici argomenti.
- Pubblicare on line The Analysis of Behavior di Holland e Skinner. Il libro parla di insegnamento programmato, un tema che sarebbe molto adatto ad essere trattato in formato interattivo individuale.

Abbiamo molte idee perché la Fondazione possa mettersi al miglior servizio della comunità degli studiosi behavioristi. Naturalmente tutti i progetti richiedono un finanziamento. La Fondazione ha ricevuto borse di studio e assistenza finanziaria da parte delle istituzioni, ma contiamo anche sul sostegno di privati per le attività di progetto. Ringraziamo molto chi di voi ha già contribuito e invitiamo il resto dei nostri lettori a registrarsi sul nostro sito come donatori continuativi, con frequenza mensile.Anche un piccolo contributo di soli $ 10 al mese, se ricevuto da parte di tutti gli abbonati, potrà rendere possibili questi progetti.

Japanese Translated by Naoki Yamagishi

科学の問題を１つ解決するとき、さらに多くの問題が現れるといいます。スキナー財団はそのように機能しているようです。１つの企画が完了するたびに、しなければならない多くの事柄が出てきます。スキナー財団は今後、以下の3つの企画を行いたいと考えています。

・オンラインで閲覧できるB.F.スキナーのバーチャル博物館の作成。ある「部屋」では、彼の研究について見学します。他の「部屋」では、錆びたストーブで作ったランプや子どもたちに作ってあげたおもちゃなど、彼が作ったものを見せるでしょう。補助的な「部屋」では、写真、記事、ビデオを通してスキナーの別の側面を描写します。

・オンラインや電子書籍に力を入れたスキナーの自伝を増刷します。写真、関連する音声、映像も含まれています。人、場所、主題を明らかにする文章とリンクさせることで、読み手の助けになるでしょう。

・ホランドとスキナーの「行動の分析（The Analysis of Behavior）」をインターネット上に置きます。この本はプログラム学習を含んでいて、個別の対話形式を交えて、効果的に働くでしょう。

スキナー財団には、行動主義コミュニティにもっと役立つためのアイデアが数多くあります。もちろん、すべての企画に財政支援が必要です。スキナー財団はいくつかの組織から助成金や資金援助を受けています。しかし、企画の運営について、個人の支援も期待しております。すでに援助いただいている多くの方々に深く感謝いたします。我々のサイトにおいて、月々のご寄付への登録をその他の読者にお勧めしています。すべての読者から、毎月10ドルのご寄付をいただければ、上記の企画が可能になります。

from the president

Korean Translated by Yunhee Shin

과학적인 하나의 문제를 풀려고 할 때, 12개의 문제가 더 생긴다는 말이 있습니다. 스키너 재단은 이와 유사한 구조를 가지고 있는 것 처럼 보입니다. 하나의 완성된 프로젝트에서, 12개의 다른 것들이 더 생기니까요. 여기 저희 재단에서 해야할 3가지 미래 프로젝트가 있습니다. :

- 하나는B.F.스키너의 온라인 가상 박물관 만들기입니다. 하나의 "방"을 만들어 그가 해 놓은 것에 대해 투어를 하는 것입니다. 녹슨 난로판의 램프나 자녀들을 위해 만든 장난감과 같은 그가 만들어 놓은 것들을 보는 것이지요. 또 다른 "방"은 스키너의 생애를 볼 수 있는 사진이나, 연구물, 그리고 비디오 자료들을 보여주는 방입니다.
- 두번째는 스키너의 자서전을 온라인 또는 eBook이 지원되는 버전으로 재발행하는 것입니다. 사진과 관련된 오디오, 비디오 섹션들을 포함해서 말입니다. 사람과 장소, 그리고 주제가 명확히 언급된 링크들은 독자들에게 도움을 줄 것입니다.
- 마지막은 Holland 와 스키너의 책, 행동분석(The Analysis of Behavior)의 온라인버전입니다. 이 책은 개인 상호작용 형식의 잘 구성된 프로그램 교재로 구성되어 있습니다.

저희재단은 행동적 공동체에 기여할 더 많은 아이디어를 가지고 있습니다. 물론, 모든 프로젝트가 자금을 필요로 하지는 않습니다. 저희재단은 기관들로부터 지원금이나 재정적 도움을 받고 왔습니다만, 프로젝트 활동을 위한 개인 지원도 기대하고 있습니다. 이미 기여해주신 많은 분들에게도 감사의 인사를 전합니다. 저희는 매달 기부를 위해 저희 웹사이트에 가입을 하신 독자들 중 몇분을 초대합니다. 구독자 중 한달에 10달러정도 기부하신 분들은 이 프로젝트에 참여하실 수 있답니다.

Portuguese Translated by Bruna Colombo dos Santos

É dito que quando você resolve um problema em ciência, uma dúzia a mais de problemas aparecem. A Fundação parece funcionar dessa forma. Para cada projeto completado, dúzias de outras coisas para fazer ocorrem. Aqui estão três projetos futuros que a Fundação gostaria de realizar:

- Criar um museu virtual on-line sobre B. F. Skinner. Uma "sala" seria um passeio sobre seu estudo. Outra poderia mostrar coisas que ele construiu, como uma lâmpada a partir de uma grelha de fogão enferrujada, ou brinquedos que eles fez para suas filhas. "Salas" adicionais ilustrariam aspectos da vida de Skinner com fotos, artigos e vídeos.
- Fazer uma reedição da autobiografia de Skinner numa versão on-line ou eBook. Fotos e seções relevantes de áudio ou vídeo seriam inclusas. Links identificando pessoas, lugares, ou tópicos mencionados ajudariam os leitores.
- Colocar o livro "A análise do Comportamento" de Holland e Skinner on-line. O livro consiste de instrução programada e funcionaria bem num formato interativo individualizado.

Nós temos muito mais ideias para a Fundação servir melhor a comunidade comportamental. É claro, todos os projetos requerem fundos. A Fundação tem recebido subsídios e assistência financeira de instituições, mas nós também contamos com suporte individual para atividades de projeto. Mesmo uma contribuição de $10 mensais de todos os nossos assinantes tornaria estes projetos possíveis.

Russian Translated by Alexander Fedorov

Говорят, что когда решаешь в науке одну проблему, появляется еще дюжина. Похоже, то же можно сказать о деятельности Фонда. На каждый завершенный проект возникает еще дюжина других дел, которые нужно сделать. Вот три будущих проекта, которые хотел бы реализовать Фонд:

- Создать виртуальный музей Б.Ф. Скиннера, доступный онлайн. Одна «комната» будет туром по его исследованиям. В других могут быть показаны вещи, которые он создал, например, лампа из ржавой печной решетки или игрушки, которые он сделал для своих детей. Дополнительные «комнаты» могут иллюстрировать другие аспекты жизни Скиннера в фотографиях, статьях и видео.
- Переиздать автобиографию Скиннера онлайн или в улучшенном варианте в виде электронной книги. Переиздание может включать фотографии и разделы с важными аудио- и видеозаписями. Читателю могли бы помочь ссылки, позволяющие определить упомянутых людей, места и темы.
- Выложить онлайн работу Холланда и Скиннера «Анализ поведения». Книга состоит из программных инструкций, которые хорошо бы работали в индивидуализированном интерактивном формате.

У нас есть еще много других идей о том, как Фонд может лучше служить поведенческому сообществу. Безусловно, все проекты требуют финансирования. У Фонда есть гранты и финансовая поддержка от организаций, но мы также рассчитываем на индивидуальную поддержку проектной деятельности. Большое спасибо тем из вас, кто уже сделал свой вклад. Мы приглашаем остальных наших читателей подписаться на ежемесячное пожертвование на нашем сайте. Даже $10 ежемесячно от всех подписчиков сделают возможной реализацию этих проектов.

Spanish Translated by Elberto Antonio Plazas

Se dice que cuando en ciencia solucionas un problema, aparece una docena de nuevos problemas. Así parece funcionar la Fundación. Por cada proyecto finalizado, una docena de cosas nuevas suceden. He aquí tres proyectos futuros que le gustaría realizar a la Fundación:

- Crear un museo virtual on-line B. F. Skinner. Una 'sala' sería una visita a su estudio. Otra podría mostrar cosas que él construyó, como una lámpara a partir de la parrilla de una estufa oxidada, o juguetes que hizo para sus hijos. 'Salas' adiciones ilustrarían otros aspectos de la vida de Skinner con fotos, artículos y videos.
- Reimprimir la autobiografía de Skinner en una versión aumentada on-line o como libro electrónico. Serían incluidos fotos y audios o videos relevantes. Podrían ser de ayuda para los lectores enlaces que identifiquen personas, lugares y temas.
- Poner en línea El Análisis de la Conducta de Holland y Skinner. El libro consiste de instrucciones programadas que funcionarían bien en un formato interactivo individualizado.

Tenemos muchas más ideas para la Fundación, para servir mejor a la comunidad comportamental. Por supuesto, todos los proyectos requieren financiamiento. La Fundación ha recibido subvenciones y ayuda financiera de las instituciones, pero también contamos con apoyo individual para las actividades proyectadas. Muchas gracias a aquellos de ustedes quienes ya han hecho sus contribuciones. Invito al resto de nuestros lectores a inscribirse en nuestra página web para hacer las donaciones mensuales. Incluso una contribución de US$10 mensuales de todos los suscriptores hará posible estos proyectos.

editor's column

Skinner frequently discussed how to make the world a better place. In *About Behaviorism* he stated, "A way of life which furthers the study of human behavior in its relation to the environment should be in the best possible position to solve its major problems…because the great problems are now global."

Skinner's declaration to improve significant social problems included two major components that must be considered. First, he mentions that we must further the study of behavior without forgetting the role the environment plays. Second, he mentioned that behavior analysis could solve global problems. In order for this to happen, dissemination of the science must also occur.

In this publication we will take a closer look at the advancement of the science of behavior. Some of the topics presented range from practioner's perspective on the scientific roots to current research on variation and selection. The *Science Corner* will discuss the history of the science while shining light on further studies in human behavior. Two book reviews on Pavlov, Russia's most famous physiologist, remind us of the importance of an experimental analysis of behavior. When you have read the publication, we are confident that you'll understand why Skinner kept a signed picture of Pavlov in his study.

This edition of *Operants* presents a step forward in the dissemination of the science to you, our Subscribers. This is the first time *Operants* includes profiles of behaviorists from Hong Kong, Taiwan, and South Korea. In addition, a renowned behaviorist, who worked in Spain, Canada and New Zealand, will discuss functional assessments. Finally, two enriching and entertaining conferences described in detail might tempt you to purchase a flight to Norway or Brazil for those events next year.

Operants continues to strive to provide enriching articles. The dissemination of the science has spread and continues to spread around the world. Maybe not at the rate we would like to see, but nevertheless, at a rate that increases its impact. We hope that when you finish turning these pages, you will know that the world is indeed becoming a better place because the study of human behavior continues to be strengthened around the world.

Sheila Habarad
Editor-in-Chief

editorial staff

Operants is a quarterly report produced by the B. F. Skinner Foundation. The opinions reflected in this *Operants* do not necessarily represent the views of the Foundation.
We reserve the right to edit all submissions for factual and scientific accuracy, however, as a rule, we preserve author's grammar and punctuation.

in this issue

reflections

The Scientific Roots of Behavior Analysis: A Practitioner's Perspective

Brenda J. Terzich, Applied Behavior Consultants, Inc.
Joyce C. Tu, Center for Behavioral Sciences, Inc.

Brenda J. Terzich

Joyce C. Tu

We first came upon Skinner's work sitting in an introductory Behavior Analysis course where the book *Science and Human Behavior* was assigned to read. Chapter three, *Causality of Behavior: "Why Organisms Behave"* most impacted our understanding of human behavior.

> "The practice of looking inside the organism for an explanation of behavior has tended to obscure the variables which are immediately available for a scientific analysis. These variables lie outside the organism, its immediate environment and in its environmental history. They have a physical status to which the usual techniques of science are adapted, and they make it possible to explain behavior as other subjects are explained in science. These independent variables are of many sorts and their relations to behavior are often subtle and complex, but we cannot hope to give an adequate account of behavior without analyzing them," (Skinner, 1953, pg. 31).

As students, this explanation provided only an academic understanding to us, but it set forth the theoretical foundation for how we practice applied behavior analysis (ABA). Skinner's summary on "A Functional Analysis" lies at the heart of influencing how we teach children with autism or any other related behavioral disorder.

"We cannot assume that behavior has any peculiar properties which require unique methods or special kinds of knowledge."…"we often argue that a person's behavior, including our own behavior, is less important than the person's intent behind it or it can only be described in terms of what the behavior means to the individual or others whom it may affect. If these statements are to be useful in changing human behavior, they must be based off of observable events, thus confining the events exclusively in a functional analysis."

Skinner's summary statement, "The external variables of which behavior is a function provide for what may be called a causal or functional analysis," best describes how we use behavior principles and concepts to target, define, and change the behaviors about which parents' or caregivers' express concerns. A functional analysis helps us to observe current contingencies, analyze the operant history that may be competing, and the ecological variables effecting those behaviors. It

allows us to answer the question "Why do the behaviors occur (behavioral excesses) or don't occur (behavioral deficits)?" without giving cause to cognitive reasoning or mentalistic explanations. We are able to change reinforcement contingencies to increase current desirable behavior, to teach new alternative behaviors while analyzing competing contingencies that result in avoidance and escape behaviors, and to develop effective behavior-reducing procedures.

In this article we will discuss the following behavior principles and concepts that have had a significant impact on teaching children with autism: empiricism, reinforcement, and generalization. A thorough explanation of each would go way beyond the length of this article so it is best to summarize what we believe are most relevant.

Empiricism

Empiricism is one of the foundations of applied behavior analysis (ABA). It gives us the ability to target, define, and measure behavior based on what is directly observed. As ABA practitioners, we have to record and analyze only what is observed and to avoid making interpretations that rely on an inner cause or agency for the child's behavior.

Empiricism guides us to look for cause of the behavior outside of the person. This then leads us to talk about one of the most important techniques in the field of ABA — functional analysis. Functional analysis allows us to observe directly the behavior of interest and to manipulate variables in the environment that control behavior. This is especially useful when working with individuals who are affected by disabilities such as autism with limited verbal skills. For most people outside of the autism community, the behavior patterns of individuals with autism may seem erratic or unpredictable. However, through direct observation and functional analysis, ABA practitioners can identify specific antecedent conditions under which the behavior does and does not occur and the consequence conditions that maintain the behavior. When we can describe behavior in such ways, we can then predict the behavior of interest, hence, to develop successful intervention plans and teaching strategies.

Reinforcement

Because behavior is a function of its consequences, reinforcement is the most important principle conceptualized. Reinforcement is the first type of consequence we train and teach that results in effective, social significant behavior change. In fact, when parents master reinforcement principles with their child, the child and family's quality of life is improved exponentially. We have not seen a more powerful principle when trained accurately in theory and practice.

For years we trained parents and staff on how to identify appropriate reinforcers (child identified), deliver them immediately after the behavior occurs, and deliver contingently only when the target response is displayed. Replication of trained reinforcement principles was paramount in the success of changing parent and staff behaviors and ultimately the child's. Family lives were transformed when mastery of reinforcement occurred because new behavior could be taught that parents had been unsuccessful in teaching.

However, we cannot talk about how to use reinforcement effectively without talking about other environmental variables such as the motivating operation (MO). When competing behavior problems interfered with effective learning, other environmental conditions had to be analyzed and manipulated. For example, we look for variables that temporarily increase the value of the reinforcers, such as the EO (Establishing Operation), and variables that temporarily decrease the value of the reinforcers, such as the AO (Abolishing Operation). Both EO and AO give us information on how we can train both effective speaker skills (manding needs and wants, and affirming, rejecting, and asking for help), as well as listener skills (instruction following, commenting about others and the world around them, and responding to other mands). In addition, they give us information on the conditional states of deprivation, satiation, and aversion so that we can increase the value of reinforcers for desirable behaviors and decrease behavior that competes with the child's learning. Furthermore, when we can see how MOs are independent from the prior stimulus, we can be more successful in achieving a behavior-altering effect, so the target behavior occurs more often under the appropriate instructional stimulus or discriminative stimuli.

MOs were probably the most challenging concept

to train theoretically and apply clinically, but certainly changed the way we trained the behavioral principle of reinforcement. The limitations of this article preclude the necessary knowledge and training needed to delineate what would be required to effectively train MOs, but you are encouraged to research further and provide training to your clinical staff on this very valuable and effective concept.

Generalization

The use of reinforcement to teach, increase or maintain desirable behaviors is perhaps where we have seen the most significant impact for children with autism. One could say that the disorder is more a result of lack of access to reinforcement, of not responding effectively to reinforcer delivery, and of a restrictive interest in obtaining different or novel types of reinforcers. The other challenge over the years is getting those whom we train to see, talk and implement reinforcement without being "overly contingent." When acquiring a new behavior, contingent and consistent reinforcer delivery is crucial. It is difficult to train the delivery of natural reinforcement required to increase the child's learning repertoires to a conceptual level or to increase the complexity of what is expected in settings of the child's daily life routines. Thus, generality of repertoires taught and generality of ABA training interventions have been crucial to the success of children with autism who successfully integrate what they have learned in ABA intervention to the "real" world.

When generalization of behaviors and response classes taught in an ABA program does not occur or is not displayed as readily in natural settings and environments, other professionals in the autism community often criticize ABA interventions as being "rigid" and producing "robotic-like" behavior patterns with the individuals we treat. The "robotic-like" term is used by these other professionals to indicate that the responses in the individual's repertoire have to do with rigid ABA training and with no "spontaneous" or "creative" responses observed. ABA practitioners often address this criticism by training both conceptual behavior and generalized response classes at the onset of the intervention.

The concept of generalization or induction was carefully described in Skinner's *Science and Human Behavior*. In it, Skinner stated that "The original probability of the response in its final form is very low; in some cases it may even be zero. In this way, we can build complicated operants which would never appear in the repertoire of the organism otherwise." This is especially true when we carefully analyze the contingencies of each response, reinforce a variety of responses that have certain response features in common rather than one specific trained response, and require the learner to do something new. Take "imitation" for example. It is a commonly taught basic skill for many individuals with autism. The imitation lesson typically starts by a trainer presenting a simple action and reinforcing copying that same action. When the action is under stimulus control, other actions are taught to the learner to develop "concept formation" of that response class. Generalization training is then immediately implemented by the trainer. She reinforces a response property of the target behavior taught in structured teaching and provides a novel stimulus such as "matching a model's behavior" on a new action the child has not seen before. As a result, we see that new response class members occur without explicit training or without reinforcement of each new response. In the case of "imitation," we can see that generalization training can result in "observational learning." By reinforcing the learner's action to match a model's behavior and all aspects of generalized responses classes, we see observational learning occur without explicit reinforcement or training.

Conclusion

This article briefly summarized how Skinner's science influences us as practitioners of behavior analysis today. In the world of autism, new "treatments" appear everyday. However, for decades the ABA program has been proven to be the most effective treatment. It is the most effective treatment because of its scientific roots in behavior analysis. We have only briefly discussed three basic concepts here. We hope, however, that this can inspire all ABA practitioners to go back and "rediscover" Skinner's science. We strongly believe that the main reason ABA practitioners are successful in treating autism has to do with basing everything we do on Skinner's science. We hope that this article can spark more discussions and correspondence among the readers of *Operants*. ●

B. F. Skinner Foundation 2015 Research Awards

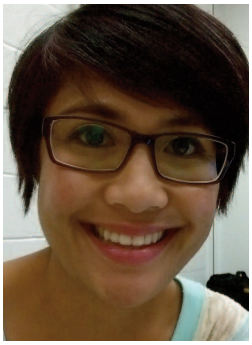
brevis

B. F. Skinner Foundation 2015 FABA Reseach Award Winner: Ashley Tudor, Florida Institute of Technology

Ashley Tudor, B.A., BCaBA, received her Bachelor of Arts in Psychology from Florida International University in 2010 and is a recent Master's of Arts graduate from Florida Institute of Technology. She has worked in the field of applied behavior analysis for five years, holding positions such as new hire staff trainer and supervisor for in-home ABA services for children with autism spectrum disorder. Her interests lie in the area of organizational behavior management, behavioral economics, impulsivity, and the assessment and treatment of challenging behavior in children with autism. Ashley received her B. F. Skinner Foundation Award for *Evaluation of stimulus delivery arrangements on staff performance in a simulated work setting.*

Abstract: Supplementary contingent pay arrangements can result in improved employee productivity and may lead to the development of more efficient performance improvement plans in organizational settings. In Experiment 1, we examined the effects of various stimulus delivery arrangements on performance in a computer-based task in a simulated work context. Participants entered hypothetical client data onto a Microsoft Excel® invoice and earned gift-cards for task completion according to the following four conditions: (a) fixed-ratio/high-preference stimuli (FR/HiP), (b) variable-ratio/high-preference stimuli (VR/HiP), (c) fixed-ratio/varied stimuli (FR/Var), and (d) variable-ratio/varied stimuli (VR/Var). Task completion increased in all reinforcement conditions relative to a no-reinforcement baseline. Further, number of rows completed was slightly higher in the FR conditions relative to the VR conditions, irrespective of the quality of the gift card earned (i.e., high preference only or varied). In a second experiment, we evaluated participant preference to perform under the four stimulus delivery arrangements using a concurrent-chains schedule. Results of the preference assessment indicated that participants preferred to work under the VR/HiP contingency, even though that condition did not produce the highest response rate during the performance evaluation. ●

B. F. Skinner Foundation 2015 CalABA Reseach Award Winner: Charisse A. Lantaya, California State University, Sacramento



Charisse Ann Lantaya, M.A. Candidate, is a Behavior Analysis graduate student in the Department of Psychology, California State University, Sacramento. Charisse Received her B. F. Skinner Foundation Award for *An Evaluation of Successive Matching-to-Sample in the Development of Emergent Stimulus Relations*.

Abstract: Traditionally, behavior analysts have studied stimulus equivalence using a matching-to-sample (MTS) preparation. While researchers have demonstrated the utility of MTS to produce conditional discriminations or equivalence classes, MTS requires several prerequisite skills for a learner to accurately respond. Without these prerequisites, MTS may produce faulty stimulus control. Basic research has shown that alternatives to MTS such as compound stimulus discrimination and successive matching-to-sample (S-MTS) has been sufficient to produce relational responding. Two experiments were conducted to evaluate the effectiveness of S-MTS as an alternative method for the establishment of stimulus relations with adults. S-MTS trials consisted of the presentation of a single sample stimulus followed by one comparison on a fixed location on the screen. Depending on the relation of the sample and comparison stimuli, the participants touched (i.e., go) or did not touch (i.e., no-go) the comparison stimulus. Twenty-four undergraduate college students participated in the study. Following training of baseline relations (AB/BC), participants received tests to evaluate whether untrained relations (i.e., BA/CB and AC/CA) emerged. Results indicated that S-MTS may be a viable alternative to traditional MTS to establish emergent relations. This study has direct implications for participants for whom traditional multi-stimuli array MTS procedures may be challenging. ●

profile

Dr. Hua (Margerate) Feng

Professor, Graduate Institute of Rehabilitation Counseling
Director, Behavior Intervention and Consultation Research Center
National Changhua University of Education
Taiwan

Interviewed and translated by Hui-Ting (Tina) Wang

Dr. Hua Feng, the first President of the Taiwan Association for Behavior Analysis (TABA), is a Professor of the Graduate Institute of Rehabilitation Counseling and the Director of Behavior Intervention and Consultation Research Center at the National Changhua University of Education, Taiwan. She received her Doctorate in the Department of Educational Services and Research, directed by Dr. G. Cartledge at The Ohio State University in the United States. Dr. Feng has published numerous articles, assessments, and books both in Mandarin and English related to autism, applied behavior analysis, and social skills training. You will be able to meet Dr. Feng at the Applied Behavior Analysis Annual Convention, as it is her primary outlet for presenting her latest research. She has received awards for excellence in research, teaching, and services in Taiwan. Most notably, she is one of the primary advocates and pioneers of ABA in Taiwan, and other Mandarin-speaking countries.

Could you share with us the history of applied behavior analysis (ABA) in Taiwan through your journey of learning, and now teaching and promoting ABA?

I was an undergraduate student in the Department of Educational Psychology, National Taiwan Normal University in the 80s. During that period of time, behaviorism was still a virgin territory in Taiwan. The term "applied behavior analysis" was first introduced in Taiwan and published by Dr. Lien-Wen Mao in 1976. The history of ABA in Taiwan started early, but developed slowly over time. People accepted, and were deeply influenced by Carl Rogers's Humanistic psychology, emphasizing the philosophy of seeing an individual as a whole person, and of respecting and caring of all human kinds. I was no exception, and my educational view fully fell under the philosophy of Rogers. When I first got in contact with behaviorism in a behavior modification class, I wasn't so sure if I understood it thoroughly enough to accept it. Therefore, it had never come across my mind to study

鳳華教授是台灣應用行為分析協會的首位理事長，現任國立彰化師範大學復健諮商研究所教授及行為輔導研究發展中心主任。在Cartledge博士的指導下，她獲得美國俄亥俄州立大學教育服務研究學系的哲學博士學位。鳳華教授出版了許多與自閉症、應用行為分析及社交技巧訓練相關的中、英期刊論文，評量工具及書籍。我們每年都能在應用行為分析國際年會上見到鳳華教授，分享她最新的研究成果。鳳華教授已榮獲台灣許多研究、教學及服務等傑出獎項。她在台灣與其他華語國家中，是應用行為分析的主要倡議者及先鋒之一。

您能從您在應用行為分析上的學習歷程、教學與推廣經驗裡，和我們分享應用行為分析在台灣的發展歷程嗎?

在80年代，我大學時期就讀國立臺灣師範大學教育心理系。在那個時期，行為學派在台灣仍是個少為人知的領域。當時普遍擁有影響力的是卡爾・羅傑斯（Carl Rogers）人本心理學的哲學思想，他提倡個體為全人的理念，並強調以尊重、關懷即可以改變一個人。我當時的教育觀亦深受羅傑斯影響。其實當我第一次在行為改變技術的課堂上接觸到行為學派時，不確定自己是否能徹底理解。因此，我那時並未想過有一天會深入研究行為學派。但在我前往美國進修前在一所職業學校任教，我發現羅傑斯的方式未能有效解決我許多學生的行為問題，我開始期望能學習更多的方法與策略來幫這些孩子。

在90年代，我前往美國俄亥俄州立大學進修。那時，Cooper博士、Heron博士與Heward博士在1987年所合著的「應用行為分析」白書第一版完全顛覆並徹底改變了我的教育觀。當時我有幸見證應用行為分析在美國蓬勃發展，也對行為學派的學者對人的尊重及關懷印象深刻。從俄亥俄州的教授們身上，我不僅學習到應用行為分析的學理，更體會到他們是出自於對人們的真誠的關愛。1999年，由美國展望教育中心的協助，邀請史金納基金會的Vargas博士、Morrow博士、ABC機構的Terzich-Garland 小姐及美國展望教育中心

it further. Then I served as a teacher in a vocational school in Taiwan. I found Rogers's approach insufficient to "solve" many challenging behaviors of students I encountered.

In the 1990s, I had a chance to advance my graduate study in the U.S. at The Ohio State University (OSU). It was Drs. Cooper, Heron, and Heward's publication of the white book "Applied Behavior Analysis" in 1987 that changed my philosophy of education. I was able to witness the thriving of ABA in the US, and was impressed by how behaviorists could respect and care for others. I learned not only the facts of ABA, but also their love for human kind. This has brought me to who I am as an educator and behaviorist today. In 1999, the first ABA workshop in Taiwan was hosted by SEEK, Inc, with contributions from Dr. Ernest Vargas and Dr. Joseph E. Morrow from the B. F. Skinner Foundation, Ms. Brenda J. Terzich-Garland from ABC, Inc., and Ms. Grace Chang from SEEK, Inc. Soon after this workshop, I visited ABC, Inc. to strengthen my ABA practical skills.

In 2001, the series of ABA-basic, intermediate, and advanced classes for practice skills were registered in four regions of Taiwan. Ms. Shu-Hwei Ke and I learned tremendously by teaching these classes. However I felt it would never be enough, unless some long standing official association was established to disseminate ABA. With that, TABA and the first university-based behavior analysis certification program were established with efforts of many professionals and parents during my term as the Chair of the Graduate Institute of Rehabilitation Counseling.

In 2006, Dr. Gerald L. Shook from the Behavior Analyst Certification Board (BACB) visited Taiwan to meet with some of the scholars in the field. With the contribution from Dr. Wen-Yin Niou from National Kaohsiung Normal University and Dr. Li-Yu Hung from National Taiwan Normal University, we translated the Glossary of ABA terminology into Mandarin Chinese, which has been used to date on the BACB website.

There is an upsurge of demand to learn ABA from many other professional fields, such as rehabilitation counseling, occupational therapy, speech and language pathology, and clinical psychology. We are glad that the needs are on the rise. The special education field has helped promote the science, which resulted in replacing "behavior modification" with "applied behavior analysis" as the university course title. Functional behavior assessment is now mandatory by the Special Education Act for students with challenging behaviors.

What are some of the cultural characteristics you see

的張證恩小姐，於台灣推動並完成第一個應用行為分析研討會/工作坊。在此研討會圓滿結束之後，我也拜訪了「ABC機構」來加強我在應用行為分析的實務技能。

2001年，中華民國自閉症總會邀請我和柯淑惠小姐辦理應用行為分析與自閉症的訓練課程，因應大量的需求，在台灣四大區域開設應用行為分析的初階、中階與進階的理論及實務訓練系列課程，報名參與情形熱烈，初階課程每場額滿人數達百位以上。而我在教授這些課程的過程中也獲益良多。然而，我認為唯有透過長期存在的正式協會來推廣應用行為分析，才能有助於應用行為分析的施行。不久之後，因應大眾的需求，台中展望中心、相關專業人士及家長與本人共同創辦了社團法人台灣應用行為分析協會，並同時在台灣的大學裡設立第一個行為分析師認證課程。

在2006年，行為分析師認證委員會（BACB）的Shook博士來台拜訪一些此領域的學者。也於同時，Shook博士提議要將行為分析的專業術語翻譯成中文，本人與國立高雄師範大學的紐文英教授及台灣師範大學的洪儷瑜教授等學者共同將應用行為分析的專業術語辭彙表翻譯成中文，迄今仍於行為分析師認證委員會官網上公告使用。

目前已經進入2010年代，應用行為分析在其他專業領域，例如：特殊教育、復健諮商、職能治療、語言治療和臨床心理學的領域需求急速增加。我們樂於見到此需求。更為甚者，為彰顯特殊教育領域對本專業的重視，教育部已經頒布「應用行為分析」為特殊教育教師的必修課程，並得以代替「行為改變技術」成為正式課程名稱。此外，目前台灣的特殊教育法施行細則已明文規定，為情緒及行為問題學生提供必要性的行為功能評量並提供行為介入方案。

*註：「應用行為分析」一詞在1976年首次由毛連塭教授引進台灣並出版相關文章論述。應用行為分析的歷史在台灣開始得不算晚，但隨時間發展較緩慢。

您認為台灣有哪些文化特質影響了應用行為分析的實施?在推廣應用行為分析時是否仍有存在的挑戰呢?若有的話，您認為如何克服?

影響應用行為分析在台灣實施的文化背景因素相當多元且獨特。就如同我剛剛所提到的，近50年來，台灣高等教育，應用行為分析是以「行為改變技術」出現在課程名稱中。這名稱及其應用在高等教育有著多重涵義。首先，「行為改變技術」中的「技術」給人的印象就是技術本位，然而強調技術而忽略理論確可能會窄化此學門，同時也暗示其太過艱澀複雜導致一般大眾無法理解。「改變」一詞的選用也可能意味著此技術的操控性強且少了對人的尊重。台灣的社會普遍誤以為使用行為改變技術的教師常忽略了孩子們的學習自主性，而這和老師傳統循循善誘的社會形象不符。正如你我所知，孔子儒家思想在台灣文化根深，

that strengthen or weaken ABA practice in Taiwan? Do you see any challenges in promoting it? How do you envision yourself to overcome these challenges?

The culture and background, which influence ABA practice in Taiwan have been dynamic and unique. ABA in Taiwan started with the course titled "Behavior modification" in higher education over half a century ago. This title and its use in higher education had multiple implications. First, the techniques described in behavior modification were merely viewed as academic theories; and theories implied little application by practitioners. The theories were too complex for the general public to understand. The word choice of "modification" also implicated that the techniques were manipulative and had little regard for people, especially children. Teachers who applied behavior modification techniques, were misled to ignore children's autonomy of learning, which discredited their social image of gradual, perhaps indirect, guidance. The culture in Taiwan is deeply rooted in Confucianism, and people admire and assume children should sincerely take responsibility of their own learning and enjoy the process. This is an ultimate goal as a behaviorist as well, but behaviorists do not assume every child is born with it; they think it is learned. Traditionally, children with good grades often win reputation of being a good child. Otherwise, children themselves are to blame for not having good grades. People misleadingly thought that behaviorism will change a child into a passive dull learner which is against our traditional belief. However, you and I know this is not true from Skinner's perspective. All his work begins with the child's needs and motivation. This is why humanistic psychology was popular. It merged into our culture so well. It encouraged teachers to play a caring role for all children and they would grow and change themselves. Once this impression and bias are established, it is challenging to motivate people to advance their understanding of behaviorism.

Another aspect of the culture which is challenging for ABA, is the emphasis of an inner state change of a person, but not the outer behaviors shaped by the environment when learning. Confucianism discussed the importance of morals and merits and how they cultivate a perfect person. However, it cannot be ruled out that the inner state change may in fact be naturally reinforced by the environment. It should not simply be a true or false statement. They are mutually confounding. This also explains a tendency of the culture in Taiwan,

人們認同其思想並認為孩子應對自己的學習負責並享受學習的過程，其實，這正是行為學派學者的終極目標，只是行為學派更務實，他們認為享受學習不是與生俱來的，是經由學習而來的。然而，這樣的理念並未被台灣社會看到。因此，人們常曲解行為學派，誤以為行為學派違反我們的傳統信念，會讓孩子變成一位被動的學習者。然而，我們都知道這並非史金納（Skinner）的觀點，因為他所有的主張都是以孩子的需求、動機為出發，強調環境的正向支持，其最終目標則是要達成獨立自主、自我管理的內控個體，因此，Skinner對人的看重，是從每一個細小實踐中完成，而非只是形而上的論述。然而，人們常會被形而上的論述所吸引，這也是為什麼人本主義心理學派在台灣會如此盛行的原因，因為它巧妙地與我們的文化結合。人本學派鼓勵老師擔任關懷每一位學生的角色，他們以為只要提供關懷，學生們將會自己有所改變及成長。而行為學派除了關懷學生之外，更提供具體方法協助學生自我改變與成長。但是，一旦社會大眾對行為學派產生誤解後，要讓人們轉而深入了解行為學派將會變得非常有挑戰性。

再者，另一個富有挑戰性的文化觀點強調學習是一種人性內在狀態的形塑與改變。一般人普遍誤以為應用行為分析只強調外顯可以觀察的行為，與中國傳統強調內在特質似乎不太相符。其實Skinner也相當重視內在事件的，只是在探究時，還要回到可觀察可度量的基本面向。孔子儒家學說探討了許多品格與美德的重要性，以及它們如何造就一個完美的人。然而不可排除的是，內在狀態的改變，實際上可能是自然而然地受到環境的影響或強化所致。這不該僅是「是」與「非」的論述，它們應是相互影響的。這種現象也能夠解釋台灣人在政治立場、理論、論點等等都傾向二分法，等非黑即白的文化傾向。因此大眾會對行為主義有所誤解是有跡可循的，這也是在推動行為分析理念時，必須要面對的挑戰。

台灣文化基本上是較不利於科學發展的。「有一位名人住在我們每個人的心中……他名叫差不多先生」，這是胡適先生曾創造的反諷人物，目的在嘲諷中國人/台灣人處事不精確，總認為差不多就可以了。但對一位行為學派者及科學家而言，差不多其實就差很多了，一秒鐘也可能會造成很大的差異（比如：增強的立即性）。另外，我們的政策常是由執政者的自由意志決定而非基於數據、證據來決定。

呈上所述，在過去我們存在既有文化的挑戰，使得台灣在學習及推動應用行為分析是相當緩慢的。然而，現今的文化是動態的，且與過去相比，台灣文化正處於快速轉變的世代。台灣人有個很大的優勢，即當執政者做出決定後，執行速度便會在彈指間啟動並產生骨牌效應，進而快速全面施行，目前台灣教育當局已經將應用行為分析正名，對未來推廣應用行為分析的影響效應是可以期待的。此外，台灣人的心胸是非常開闊的。比起以往，現代人深受網路影響，對多元觀點、多元文化的

when people like to "pick a side" in politics, theories, opinions, and so on. Moreover, people are not used to working together and identifying a mutual goal. It is either work parallel with each other in a group for harmony, which is a word highly respected based on Confucianism, or become/follow the lead. Communication and collaboration seem challenging to us.

The culture in Taiwan is basically unfavorable to science. "We have a famous man that lives in every one of us…. His name is Mr. Close Enough." An irony figure created by Shih Hu (1918) which was used to describe that Chinese and Taiwanese people are not precise; and that "close enough" is good enough. As a behaviorist and scientist, "close enough" is not enough, and often makes a big difference. For example, immediate versus one second delayed reinforcement is a huge difference for teaching a new skill. In Taiwan, policies and decisions are made by the lead authorities, not based on numbers and evidence.

We sure have had challenges in the culture that could not move ABA further faster in the past. However, the culture is dynamic, and there is definitely a faster generation change now than in the past. When authorities make decisions, the domino effect of execution occurs in a snap of a finger. I should say people in Taiwan are very open-minded. Partly due to the Internet, accepting diversity and multiculturalism is more active than ever before. This gives us a good opportunity to disseminate and clarify the most updated and accurate information about ABA. I am firmly convinced that persistency of what TABA and many others have done so far, including ABA series of classes for practitioners, university-based behavior analysis certification programs, demonstrating ABA practices in natural settings, and changing the course name to "applied behavior analysis", will overcome the challenges and bring us to a new era of ABA collaboration among disciplines in Taiwan.

What is your favorite highlight about ABA? What and how it makes your current position as a pioneer and advocate of Skinner's work and ABA in Taiwan?

I have never envisioned myself to be a pioneer for ABA in Taiwan. On the contrary, I am much honored to be one of the many who promotes ABA. The main motivation which brought me to this field has been the desire of learning of

接受度也變得更為開放。這使我們有絕佳的機會可以來闡明並推廣應用行為分析最新、最正確的資訊。我堅信，「社團法人台灣應用行為分析協會」及其他許多專業人士迄今所努力的，包含開設應用行為分析系列培訓、在大學開設行為分析認證課程、在自然環境中示範應用行為分析，以及將課程名稱正名為「應用行為分析」，已經展現台灣大眾對應用行為分析開啟了嶄新的觀點，並將能克服前世代所面臨的挑戰，帶領我們台灣進入一個跨領域合作的應用行為分析新世代。

您最喜歡應用行為分析的哪一部分？是什麼又如何讓您成為史金納理論的倡議者與應用行為分析在台灣的先驅？

我從未想過自己能成為台灣應用行為分析的先鋒，但倒是很榮幸可以成為推動ABA的一分子。引領我來到這個領域最主要的動機是學習者受惠於應用行為分析而成為主動學習者、獨立自主者。藉著行為原理原則的妥善運用，我看見他們的學習進步與正向的改變。他們學會自我控制與自我肯定來提升生活品質，而這對我來說就是個自然增強。在其他理論或做法中，我無法找到與此等同的影響。我非常佩服Skinner的真知灼見，也希望能成為他的追隨者，讓專業人員也能飽享其豐富的智慧與學理。此外，在推動ABA的同時，我也發現許多家長及教師們開始會運用增強制度來強化兒童的行為，而在使用增強制度的同時，他們也被其結果增強了，如此的良性循環，讓他們感到滿足且有成就感。因此，應用行為分析，可以讓生活變得更加美好，也讓社會更積極正向。

牛頓曾說過：「如果我看得比別人遠，那是因為我站在巨人的肩膀上。」
然而，我們的巨人史金納卻在他理論的結論中寫道：「為什麼我還是一直不被人瞭解呢?」您認為呢？我們現在有更好的機會來與其他科學領域互動了嗎?

史金納的理論是相當全方位，實用且詳盡的。他已經樹立了一個良好的典範，用正向的方式與其它領域或學門自由互動交流。因此，他的本意是不需要與其他領域對抗，而是使之更趨完整。

我想談論的第一位其他領域的代表性學者是馬斯洛（Maslow）；馬斯洛相信人類需求是有階層的，從最基本層次的生理需求（如：食物、水、呼吸、睡眠）、歸屬感、尊重到最高層次的自我實現需求。馬斯洛也認為唯有低層次的需求獲得滿足後，較高層次的需求才有可能被滿足。這個概念與行為學派「由原級增強逐步成為個體的自動增強」、以及如何善用動機操作有異曲同工之妙的。

第二位其他領域的代表性學者是認知心理學家喬姆斯基（Chomsky）；喬姆斯基主張人類複雜的語法能力與創造力是與生俱來的。史金納則是較強調如何使用以行為為基礎的方式來幫助一個人習得複雜的語法能力與創造力，而這些方法包含了：單一嘗試教學法（discrete trial training）、語言行為法（verbal behavior）、多重範例（multiple exemplars），以及擴散（divergent）或聚斂性（convergent）思考等等。Goetz和Baer 早在

the learners themselves. With appropriate application of behavior principles, I see them learn, improve, and change. They are able to self-control and self–value to enhance their quality of lives. This is a natural reinforcement to me. I cannot find the same impact from other theories or practices. I admire Skinner's penetrating insight so much, and am committed to be his follower. I also see parents starting to use reinforcement, and they are reinforced by the result of using it. They feel a sense of achievement and satisfaction. Thus, with ABA, life becomes more beautiful.

> **Well-known saiyng from Newton goes: "If I have seen farther than others, it is because I was standing on the shoulders of giants." However, our giant, Skinner, concluded his work and wrote "Why have I not been more readily understood? (**Catania & Harnad, 1988**)" What is your response to this? Have we had better chances to interact with other science fields or disciplines?**

Skinner's work is very comprehensive, practical, and detailed. He has set a good platform to interact with other fields or disciplines. Therefore, to go against them was not his intention, but to complete them. The first scholar of other fields I would like to talk about, is humanistic psychologist Maslow who believed human needs are formed in a hierarchy, from lowest physiological needs (e.g., food, water, breathing, sleep) to highest self-actualization needs (e.g., morality, creativity, problem solving). A higher level of needs cannot be satisfied unless the previous one was met. This conceptual framework is well aligned with the hierarchy of reinforcers from primary to secondary reinforcer and how motivating operations function.

Another represented scholar of other field is cognitive psychologist Chomsky who claimed that humans are born with complex language structure capability and creativity. Skinner emphasized more on how to facilitate one to acquire and maximize them by using a behavioral-based approach, such as discrete trial training (DTT), verbal behavior approach, with multiple exemplars, divergent/convergent thinking, etc. Later, Goetz and Baer (1973) used differential reinforcement to increase creativity of building blocks. Unlike the rumor we often heard, Skinner's work also explained how one's inner state, such as thinking, creativity and emotions, is learned. Being creative will receive natural reinforcement, i.e., attention, from the environment, and will be maintained or increased. Skinner's verbal behavior also provided a rationale of casual relation of a private event, such as emotions, which can be learned as well.

1973年即使用了區別性增強來增加堆疊積木的創造力。此研究證實史金納的理論也能解釋了人的內在狀態的習得，例如：思考、創造力、情緒等等。在展現創造力的同時，也使得人們從環境中獲得維持的自然增強（如：受關注）。史金納的語言行為一書中也闡明了個人習得情緒行為的方式，可以窺見Skinner還是相當關注內在事件的。我的研究團隊於ABAI年會近期發表的研究中提供了證據，說明善用應用行為分析的學習原理能改善自閉症兒童的擴散思考能力、物品替代的象徵能力及情緒的表達與因果關係的辨識。

第三位學者是認知發展心理學家皮亞傑（Piaget）；其主張孩子在不同的發展階段有其認知發展的特質。他發現認知發展的特質包含質與量的改變。但，此傑出的架構並未讓我們解決下列問題：「萬一孩子的發展並未如我們所預期的發展呢?」而史金納的理論便是成就皮亞傑發展理論的重要推手，提供了實質的方法協助「未遵循者」回到正規發展中。舉例來說，在皮亞傑的認知發展論中，象徵性遊戲是認知發展中「質」的改變的指標。而善用史金納的提示、刺激控制與多重範例的方式，是可以協助特殊的孩子達到象徵遊戲的發展里程碑。我的研究也累積了藉由應用行為分析策略的運用，例如：核心反應訓練，而使孩子的象徵性遊戲產生發展「質」的改變的實證證據。

最後，史金納在提示策略的理論與社會發展心理學家維果茨基（Vygotsky）的最近潛能發展區及鷹架理論產生共鳴。因為他們都非常重視環境因素所帶來的影響。

如上所述，不同的典範確實能發展出不同的人類發展的概念架構，且這些都能引領我們朝更好的生活品質與未來的共同目標前進。然而，史金納和行為學派學者不僅提供我們一個對人類行為理解的完整架構，更提供我們如何（how）運用科學方法來成就及解決其他領域未能解決的問題。因此，這讓我相信史金納所留給我們的是一個紮實的平台架構，並提供明確的方向供跨領域合作。雖然對於其他領域來說，要瞭解史金納或是瞭解他是多麼希望融合其他領域的心意，是相當具有挑戰性的，但我相信在不久的將來，他全方位、實用且細緻的理論將會被其他領域與學科所瞭解並應用之，為大眾創造更美好的生活。●

Several studies my research team recently published provided evidence of improving divergent thinking and emotion of children with autism by using ABA teaching strategies.

The third scholar is cognitive development psychologist Piaget who found and described the characteristics of children development in different periods. He suggested cognitive development involved changes in both quantity and quality. However, this outstanding framework does not allow us to solve the problem "what if the child's development does not follow the norm as expected?" Skinner's work backed up and facilitated the "none-followers" to go back on track. For example, pretend/symbolic play in Piaget's development theory was an indicator of quality change. Skinner was able to use prompting, stimulus control, and multiple exemplars to assist a child to achieve the developmental milestone of pretend/symbolic play. I have also accumulated evidence of developmental quality change of symbolic pretend play through ABA teaching strategies, such as Pivotal Response Training.

Finally, Skinner's work on prompting also echoed the social development psychologist Vygotsky's zone of proximal development and scaffolding theory. They both weighed high on the influence of environment.

From the above, we may be able to acknowledge that different paradigms have different outstanding conceptual frameworks of the human development and that all lead us to a better quality of life and future as a mutual goal. However, Skinner and behaviorism provided us not only "what" the conceptual framework looks like, but also the scientific tools about "how" to accomplish and solve problems of every field or discipline. Thus, it makes me believe what Skinner left us was a solid foundation and clear direction for collaboration. Although it has been quite challenging for other fields or disciplines to understand him and to realize how he wished for inclusion, I am confident that in the near future his comprehensive, practical, and detailed work will be understood by, and applied to other fields and disciplines. ●

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profile

Dr. Javier Virués-Ortega, BCBA-D:

The Impact of Functional Assessments on the Field

interview by Dr Katerina Dounavi, BCBA-D

Javier Virués-Ortega is a senior lecturer and director of the Applied Behaviour Analysis programme at the University of Auckland (New Zealand). He is also a member of the board of directors of the BACB. Before his tenure in Auckland, he was assistant professor at the University of Manitoba (Canada), post-doctoral researcher at the Insitituto de Salud Carlos III (Spain), and clinical psychology resident (Spain Health Ministry competitive residence program). He has completed pre- and post-doctoral scholarships at the University of Hawaii and the University of Florida under the supervision of Dr. Stephen N. Haynes and Dr. Brian A. Iwata. His research focuses on the neural, emotional, and behavioural factors of problem behavior, particularly among individuals with developmental disability. He also has an interest in the extension of behavior analysis applications to general clinical psychology and complex language processes. His work has been supported by the Canadian Institutes of Health Research and other reputed international agencies. He is author of over eighty specialized publications.

How did you become interested in Skinner's work and functional assessments/analyses in particular?

When I was an undergraduate student in Southern Spain in the late 90s there was considerable interest from a small number of scholars at the University of Granada on functional analysis: Tomás Carrasco and Antonio Fernández, among others — these names are for the most part unknown to English-speaking audiences. Also, Steve Haynes from University of Hawaii would visit often. It took me years to realize that the notions of functional analysis that they were using were different and contradictory.

Could you tell us about your research interests and current projects?

My research interests are diverse. I can give you a few examples based on the research topics of my current Ph.D. students: effective methods to establish leisure items as conditioned reinforcers (Gabe Schnerch), applied uses of the differential outcomes effect (Jessica McCormack), effects of psychotropic medication on the stability of behaviour functions (Alison Cox), experimental analysis of antecedent variables involved in food refusal and food selectivity (Sara Leadley), and syllable recombination and textual behaviour training (Iris Ponce).

How is your research on functional analyses/assessments applicable to practitioners?

I believe the studies that my students do have direct applied implications for practitioners. For example, in a recent study led by my Ph.D. student Alison Cox we looked at different strategies to help children with autism and intellectual disability remain still during MRI scans. The study provides strategies to practitioners facing this particular applied problem. However, a research study does not provide complete answers but partial ones. It's up to the practitioner's judgement to evaluate if a particular treatment evaluation is relevant to the specific applied problem they are facing.

From all the elements involved in identifying the function of a particular behaviour and putting the corresponding intervention in place, is there one or more key

features, methodologies or guidelines that you would like to highlight?

If anything, I would emphasize that functional analysis methodology is not a standard procedure, not even a standard set of procedures. The armamentarium of experimental approaches to the evaluation of behaviour functions of problem behaviour becomes more and more diverse every year. Trial-based, latency-based functional analysis, and functional analysis of precursors are just a few examples of variations of functional analysis that are now well-established in the literature. To give you another example, my research associate Kyle Hurl is currently validating, by way of component analysis and other methods, a set of data analysis guidelines specifically aimed at connecting functional analyses compatible with automatic reinforcement with specific treatments. Thus, practitioners and researchers ought to be up to date to these variations.

Are there any particular questions that researchers have not responded to yet in relation to functional analyses/assessments and on which you would encourage further study?

I think there is compelling evidence to suggest that most human behaviours have operant functions. Because experimental methods of functional analysis have only been well researched for specific clinical populations and topographies (e.g., self-injury in people with intellectual disability), the potential for growth of functional analysis methodology is often underestimated. The challenge, maybe for future generations of behaviour analysts, would be to develop a technology for the experimental analysis of socially significant behaviours of people with typical development. This challenge has not been taken up yet, at least not seriously. ●

B. F. Skinner Foundation 2015 Research Awards

2015 B. F. Skinner Foundation Division 25 of the APA Award Winner: Dr. Bethany Raiff, Rowan University

The American Psychological Association (Division 25/Behavior Analysis) awarded The B.F. Skinner Foundation Young Researcher Award in the area of applied research to Collingswood resident Dr. Bethany Raiff, assistant professor in the Department of Psychology at Rowan University, Glassboro, New Jersey. The organization recognized Raiff for her research on nicotine and conditioned reinforcement, technology-based interventions, and gamification as well as her potential for future research accomplishments.

A board-certified behavior analyst, Raiff conducts research in several areas and has been highly funded. Among other grants, the National Institutes of Health awarded approximately $600,000 to her and her collaborators to develop a video game for Facebook called "Up from the Ashes." Up from the Ashes is a contingency management intervention—a video game that uses nonmonetary incentives to encourage people to quit smoking, basing those incentives on verification that they abstained from smoking.

"I am truly honored to have been recognized by Division 25 of the American Psychological Association with this prestigious award for the research I have conducted over the years and for the vote of confidence in the research I plan to conduct in the future," Raiff said. ●.

events

2015 Norwegian Association of Behavior Analysis (NAFO) Conference

report by Karoline Giæver Helgesen

Photo: Storefjell Resort Hotel (www.storefjell.no)

The 42nd annual conference arranged by the Norwegian Association for Behavior Analysis (NAFO) was held at Storefjell Resort Hotel in the end of April this year. The resort is located at Golsfjellet in Hallingdal, in the central South of Norway. Situated 1,001 meters above sea level, halfway between the capital of Oslo and the second biggest city in Norway, Bergen, Storefjell Resort Hotel offers spectacular natural scenery as well as serving as a reasonably within-reach hub for Norwegians with an interest in behavior analysis from all across the country.

Karoline Giæver Helgesen

The 2015 conference had attracted some 700 registered participants, including 150 lecturers, which actually is just a hundred people short of the number of members in the Norwegian Association of Behavior Analysis (approximately 800), and exceeds the number of people the hotel could accommodate. However, the 2015 conference is the latest conference in a long series held at Storefjell Resort Hotel, and by no means the first to have a large number of registered participants. Everybody got roofs over their head, some at adjoining hotels and some in cabins nearby.

Being a five-day event lasting from April 22nd to April 26th , the annual NAFO-conference was split into a pre- and a main conference. This April, the pre-conference theme was verbal behavior, lasting for the two first days of the conference, starring amongst others invited speaker Dr. Mark Sundberg (BCBA-D).

Dr. Sundberg opened the pre-conference on verbal behavior by addressing B.F. Skinner's analysis of motivation and the value of including the concept of motivating operations (MOs) into autism assessment and intervention programs. A total of nine lecturers touched on a range of topics relevant to verbal behavior, mainly within conceptual and applied behavior analysis. Talks included overall presentations of general subjects like the role of reinforcement in verbal behavior, establishing naming, grammatical skills and fluency in reading, in addition to exemplifications of the use of Social Stories in establishing social skills. Of the structural approaches, talks were given discussing the molar multiscale view of verbal behavior, clarifying on naming in equivalence functions as well as a talk reflecting

on how a synthesis of Relational Frame Theory (RFT) and Skinner's verbal operants could improve a behavioral understanding of human language.

While the pre-conference had a specific focus on verbal behavior, the main conference lasted three days, and offered roughly 150 hours of lectures, workshops, and symposia from all walks of the behavior analyst life, in addition to poster sessions and popular social functions with an academic slant.

The main conference was opened Thursday afternoon by the President of The Norwegian Association of Behavior Analysis, John Arne Farsethås. The opening lecture held by Farsethås revolved around current research on classical conditioning and possible implications for behavior analytic understanding of basic principles. A variety of workshops followed the opening lecture, a popular event for both pre-conference participants and early arrivers to the main conference. After dinner, the Student Association of NAFO invited everybody to participate in a fairly new tradition at the annual conference: quiz night! Arranged for the second time this year, the venue was packed, with laughs, witty comments, and a selection of more or less creative competitive behaviors.

Friday's lectures included several symposia, again covering a wide selection of topics, from the planning, implementation, and best practice for evaluation of more or less pragmatic behavioral interventions, to the effect of psychotropic drugs in individuals with developmental disabilities, and training interventions for kids with mathematical difficulties, just to mention a few. Dr. Sundberg followed up on Dr. Arntzen's symposium on equivalence relations with a talk on how the quantification of private events can move us forward. Also, for five years straight, Jon-Arne Løkke (Østfold University College), has encouraged bachelor students (and others) to present their self-management projects, resulting in a varied, interesting, and inspiring annual symposium within the field of applied behavior analysis. Friday night, being the second night of the main conference, was a busy one for those wanting to cover the entirety of the official program. After the increasingly popular postersession, with thirty-three posters this year, followed the annual meeting of The Norwegian Association of Behavior Analysis. Concluding the official program Friday night, Dr. Per Holth shared with us video clips from B.F. Skinner's visit to Norway in 1983, showing both lectures given by Skinner, the Q&A-sessions after, and clips from the guided tour given by Willy-Thore Mørch and Arild Karlsen, as Skinner and his wife had uttered a wish to see the fjords. A fun and interesting end to the evening!

After a good night's sleep (for some), Saturday program tempted conference participants with lectures on punishment, reduction of challenging behaviors using DRO procedures, and a symposium on behavior analytic interventions in relation to addictions. Whether these lectures were deliberately timed to Saturday morning is unknown. Besides, the program that morning had a strong focus on the use of new technology in interventions. Presenting a total of three different softwares; Math Drills and Chartlytics (precision teaching) presented by Dag Gladmann Sørheim, and an introduction to programming in Visual Basics (designing experiments) by Dr. Holth, the focus on technology was stronger than previous years, in a very good way. Later that day, Dr. Holth chaired a symposium representing the research group "From laboratory settings to natural environments" at Oslo and Akershus University College of Applied sciences, presenting experimental studies, conceptual analysis and examples from applied settings before giving his last talk on the conference addressing distinctions between behavior analysis and main stream psychology. Other highlights included a symposia on developmental disabilities and sexuality, covering the alert- and follow-up procedures on suspicion or confirmed sexual abuse. The National Criminal Investigation Service (NCIS/KRIPOS) also gave an account of how the police proceed when questioning the developmentally disabled exposed to violent or sexual crimes.

From a very serious note to a more formal one, the gala dinner Saturday night featured lovely food, and an impeccable atmosphere in addition to awards and speeches. The board, to great applause from the audience, seized the opportunity to especially honor Hans Horne, who as a "grand old man" in the Norwegian behavior analytic circuits, after many years had decided to withdraw from his duties on the board of the Norwegian Association for Behavior Analysis (NAFO).

Two lectures Sunday morning brought an eventful, inspiring 2015 conference to a close. We're already looking forward to 2016. ●

events

XXIV Encontro Brasileiro de Psicologia e Medicina Comportamental

XXIV Brazilian Meeting of Psychology and Behavioral Medicine

report by Bruna Colombo dos Santos

The XXIV Brazilian Meeting of Psychology and Behavioral Medicine took place at Sao Judas Tadeu University, Sao Paulo, Brazil on August 19-22, 2015. The meeting is part of the activities of the Brazilian Association of Psychology and Behavioral Medicine (ABPMC), and it has taken place annually since 1991 in different Brazilian cities: Campinas, Sao Paulo, Aguas de Lindoia, Santos, Brasilia, Londrina, Campos do Jordão, Salvador, Curitiba, Fortaleza and Sao Paulo again. This year's theme was: *Science of Behavior and the Construction of a Sustainable Future.*

The meeting promoted by ABPMC offers an amazing opportunity to share the development in behavior analysis in Brazil and, beyond that, an opportunity to meet prestigious international guests. The participants of the meeting are undergraduate and graduate students, researchers, psychologists, and other professionals interested in Behavior Analysis.

Jan Luiz Leonardi, president of the XXIV Brazilian Meeting of Psychology and Behavioral Medicine.
Photo: Boteco Behaviorista

The president of ABPMC, Jan Luiz Leonardi, a doctoral student in Clinical Psychology at the University of Sao Paulo, presented data about the 2015 Meeting. 1,667 undergraduate and graduate students as well as professionals attended the conference. Most of the attendees live in Southeast Brazil (the region where the city of Sao Paulo is located). The other participants came from South, Northeast, Midwest and Northern Brazil.

The XXIV Meeting had approximately 1,000 presentations. The organizing committee of the event classified the presentations by themes: conceptual, historical, and philosophical analyses. Philosophical analysis branched into several categories, including but not limited to applied

Entre os dias 19 a 22 de agosto de 2015 ocorreu o XXIV Encontro Brasileiro de Psicologia e Medicina Comportamental na Universidade São Judas Tadeu, em São Paulo, Brasil. O encontro faz parte das atividades da Associação Brasileira de Psicologia e Medicina Comportamental (ABPMC), sendo promovido, anualmente, desde de 1991, em diferentes cidades brasileiras: Campinas, São Paulo, Águas de Lindóia, Santos, Brasilia, Londrina, Campos do Jordão, Salvador, Curitiba, Fortaleza e novamente São Paulo. O tema deste ano foi: Ciência do Comportamento para a construção de um futuro sustentável.

O encontro promovido pela ABPMC fornece uma excelente oportunidade para compartilhar o que tem sido produzido sobre Análise do Comportamento no Brasil e, além disso, ter a oportunidade de prestigiar convidados internacionais. Participam do encontro estudantes de graduação e pós-graudução em psicologia ou outras áreas, pesquisadores, psicólogos e outros profissionais que tenham interesse pela Análise do Comportamento.

Os dados fornecidos pelo atual presidente da ABPMC Jan Luiz Leonardi, doutorando em Psicologia Clínica pela Universidade de São Paulo, mostram que o encontro de 2015 contou com 1667 participantes, cuja maioria corresponde a estudantes de graduação, profissionais e estudantes de pós-graduação. A maior parte dos participantes deste ano residem na região sudeste do Brasil (região onde está situada a cidade de São Paulo), sendo a maioria do estado de São Paulo. Os demais participantes vieram das regiões Sul, Nordeste, Centro- Oeste e Norte.

O XXIV Encontro contou com aproximadamente 1000 apresentações, grande parte constituída por comunições orais

research; basic research; service provision; formation and dissemination of behavior analysis. The more attended presentations had the themes of conceptual, historical and philosophical analysis, specifically applied research and basic research.

There were Special Interest Groups (SIGs) that reunited researchers based on their common interests. The behaviorists in Brazil devote their attention to a wide diversity of themes based on the number of SIGs represented at the conference. This year, we had the following interest groups: Feminism, Women Studies and Behavior Analysis; Community Psychology and Behavior Analysis; Behavior Analysis in the Organization; Dissemination of Behavior Analysis in Brazil, Evaluation of the Teaching of Behavior Analysis in Brazil (proposed by ABPMC and the Brazilian Association of Behavior Analysis – ACBr); Therapeutic Accompaniment; Behavior Analysis Students Cultural Meeting; Behavior Analysis and Autism; Behavioral Economy; Commission of ABPMC Publications; Commission of Journeys of Behavior Analysis and Regional Events; Behavior Analysis, Computation and Artificial Intelligence; Behavioral Psychology of Sport; and Coaching.

The event had the participation of many international guest speakers; Professor Bernard Guerin, from the University of South Australia, Professor Glenn M. Callaghan, from San Jose State University; and Professor Henry Schlinger, from California State University. Professor Bernard Guerin presented on the extension of behavior analysis to contextual analysis; discussing mental heath, verbal behavior, and methods taken from other sciences that could be helpful to the behavior analysis. Professor Glenn Callaghan talked about interpersonal therapy and functional analytic psychotherapy. He also took part in discussions with Brazilian researchers on the subject of behavior analysis in clinics.

Professor Henry Schlinger discussed conceptual issues of verbal behavior. His presentation was dedicated to a behavioral approach of consciousness. He showed how consciousness has been historically treated by philosophy. Further he proposed how behavior analysis can help the comprehension and experimentation related to the behaviors that have been traditionally treated under the label of "consciousness".

The ABPMC had a special track that focused on

e paineis. Os trabalho foram classificados pela diretoria e organização do evento por temas: análises conceituais, histórica e filosóficas; pesquisa aplicada; pesquisa básica; prestação de serviços; formação e disseminação da Análise do Comportamento; e outros. Os temas que mais apareceram foram: análises conceituais, histórica e filosóficas; pesquisa aplicada e pesquisa básica.

Os grupos de interesse são atividades que reunem pesquisadores interessados sobre um tema específico. Vale a pena mencionar de forma mais detalhada esta atividade porque mostra a diversidade de temas pelos quais analistas do comportamento no Brasil tem se debruçado. Este ano ocorreram os seguintes grupos de interesse: Feminismo, Estudos das Mulheres e Análise do Comportamento; Psicologia Comunitária e Análise do Comportamento; Análise do Comportamento nas Organizações; Divulgação da Análise do Comportamento no Brasil; Avaliação do Ensino de Análise do Comportamento no Brasil (prosposto pela ABPMC e pela Associação Brasileira de Análise do Comportamento – ACBr); Acompanhamento Terapêutico; Encontro Cultural de Estudantes de Análise do Comportamento; Análise do Comportamento e Autismo; Economia Comportamental; Comissão de publicações da ABPMC; Comissão de Jornadas de Análise do Comportamento e Eventos Regionais; Análise do Comportamento, Computação e Inteligência artificial; Psicologia Comportamental do Esporte; e Coaching.

Contamos com as participações de convidados internacionais, como o Prof. Bernard Guerin da South Autralia University; Prof. Glenn M. Callaghan, da San Jose State University; e do Prof. Henry Schlinger da California University. O Prof. Bernard Guerin discutiu extensão da Análise do Comportamento para uma Análise Contextual, discutindo mais afuniladamente comportamento verbal e métodos derivados de outras ciências que podem ser úteis para Análise do Comportamento (como a observação participante), e também falou sobre saúde mental. Prof. Glenn Callagnhan falou sobre Terapia Interpessoal e FAP, e participou de outras atividades, com pesquisadores brasileiros, discutindo Análise do Comportamento na Clínica. Prof. Henry Schlinger discutiu questões conceituais sobre comportamento verbal, e também fez uma apresentação sobre uma abordagem analítico comportamental da consciência, mostrando, historicamente, como a consciência tem sido tratada dentro da filosofia e como a proposta da Análise do Com-

community improvement and the culture at large. One presentation discussed the project "Cycling," which promotes bicycling as a common way of transportation. Another talk presented "Traversing — Eyes by Pages and Books of the World," promoting the exchange of used books. The Contingencies of Cultural Selection Symposium included the participation of behavior analysts interested in discussing culture in applied, theoretical, and experimental terms.

The Ist Cultural Meeting of Behavior Analysis Students and the V Symposium of Aversive Control (SICA) also took place. The Cultural Meeting was held at Sao Judas Tadeu, where teams of Behavior Analysis students of different parts of the country participated in games and recreational activities that had 'learning about behavior analysis' as its backdrop. The V SICA happened at University of Sao Paulo which set the stage for the opportunity to debate many questions related to applied, theoretical, and experimental questions about aversive control. The symposium was organized in partnership with researchers from the University of Sao Paulo (USP) and the Federal University of Para (UFPA) by Professor Maria Helena Leite Hunziker and Professor Marcus Bentes de Carvalho Neto.

In short, the XXIV Meeting of Psychology and Behavioral Medicine had many activities, showing the diversity of interests and the dissemination of Behavior Analysis throughout Brazil. The Meeting has been an event that congregates researchers of many laboratories of behavior analysis. Given the enormous territorial extension of Brazil, an opportunity for researchers to get together at one place simultaneously, sounds to me of extreme importance to scientific relations and also an excellent opportunity to see old friends and make new ones. The meeting of 2016 already has a date, it will be happening between the 6th and 10th of September in Foz do Iguacu, in the state of Parana. The city is gorgeous and one of the Brazilian tourist destinations, known mainly as "Iguazu Falls". We are looking forward to the next meeting! ●

portamento pode auxiliar na compreensão e experimentação relacionadas aos comportamentos que tem tradicionalmente sido tratados sob o rótulo de "consicência". Eu tive o prazer de ver as apresentações do Prof. Bernard Guerin e do Prof. Henry Schlinger, e elas foram muito empolgantes.

Além do Encontro propriamente dito, ocorreram algumas atividades antes e durante o encontro que também merecem destaque. A ABPMC comunidade é um projeto que busca levar a Análise do Comportamento para a comunidade em geral por meio de palestras e projetos, como o projeto "Pedalando" que promove o uso da bicicleta como meio de transporte, e o projeto "Percorrendo – olhos pelas páginas e livros do mundo" que promove a troca de livros usados. Durante o encontro foi realizado o Simpósio Contingências de Seleção Cultural, que contou com a participação de pesquisadores analistas do comportamento, interessados em discutir cultura em termos aplicados, teóricos e experimentais.

Antes do Encontro também ocorreram o I Encontro Cultural de Estudantes de Análise do Comportamento e o V Simpósio sobre Controle Aversivo (SICA). O Encontro Cultural ocorreu na Universidade São Judas, onde equipes de estudantes de Análise do Comportamento de diversas partes do país participaram de jogos e atividades lúdicas que tinham como pano de fundo 'aprendizagem sobre análise do comportamento'. O V SICA ocorreu na Universidade de São Paulo, onde foram debatidas, em um dia todo de programação, questões aplicadas, teóricas e experimentais acerca do controle aversivo. O simpósio é realizado via uma parceria entre pesquisadores da USP e UFPA: Prof. Maria Helena Leite Hunzkier e Prof. Marcus Bentes de Carvalho Neto.

Em resumo, o XXIV Encontro de Psicologia e Medicina Comportamental contou com inúmeras atividades, mostrando a diversidade de interesses e a disseminação da Análise do Comportamento pelo Brasil. Pessoalmente, eu tenho visto que o encontro tem sido um evento que congrega pesquisadores de diversos laboratórios de Análise do Comportamento ou com linha de pesquisa na área do país; dada a extensão territorial do Brasil, uma oportunidade de reunir os pesquisadores durante um período num mesmo local, me parece de extrema importância para as relações científicas e também uma excelente oportunidade para rever amigos. O encontro de 2016 já tem data, será realizado de 6 a 10 de setembro em Foz do Iguaçu, no estado do Paraná. A cidade de Foz é belissima e é um dos destinos turísticos brasileiros, conhecida, principalmente, pelas Cataratas do Iguaçu. Estamos ansiosos pelo próximo encontro! ●

Conditioned Reflexes

Excerpt from *Science and Human Behavior*

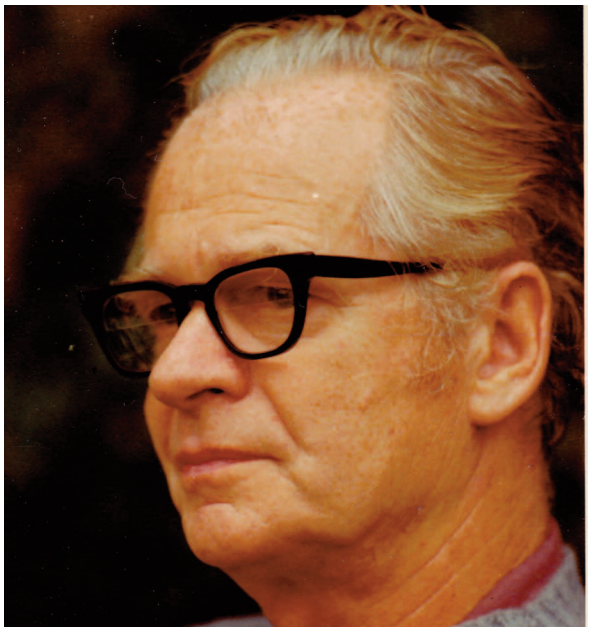
from the archives

by B. F. Skinner

The reflex became a more important instrument of analysis when it was shown that novel relations between stimuli and responses could be established during the lifetime of the individual by a process first studied by the Russian physiologist, I. P. Pavlov. H. G. Wells once compared Pavlov with another of his distinguished contemporaries, George Bernard Shaw. He considered the relative importance to society of the quiet laboratory worker and the skillful propagandist and expressed his opinion by describing a hypothetical situation: if these two men were drowning and only one life preserver were available, he would throw it to Pavlov.

Evidently Shaw was not pleased, and, after what appears to have been a hasty glance at Pavlov's work, retaliated. His book, *The Adventures of the Black Girl in Her Search for God,* describes a girl's experiences in a jungle of ideas. The jungle is inhabited by many prophets, some of them ancient and some as modern as an "elderly myop" who bears a close resemblance to Pavlov. The black girl encounters Pavlov just after she has been frightened by a fearful roar from the prophet Micah. She pulls herself up in her flight and exclaims:

> "What am I running away from? I'm not afraid of that dear noisy old man."
>
> "Your fears and hopes are only fancies" said a voice close to her, proceeding from a very shortsighted elderly man in spectacles who was sitting on a gnarled log. "In running away you were acting on a conditioned reflex. It is quite simple. Having lived among lions you have from your childhood associated the sound of a roar with deadly danger. Hence your precipitate flight when that superstitious old jackass brayed at you. This remarkable discovery cost me twenty-five years of devoted research, during which I cut out the brains of innumerable dogs, and observed their spittle by making holes in their cheeks for them to salivate through instead of through their tongues. The whole scientific world is prostrate at my feet in admiration of this colossal achievement and gratitude for the light it has shed on the great problems of human conduct."
>
> "Why didn't you ask me?" said the black girl. "I could have told you in twenty-five seconds without hurting those poor dogs."
>
> "Your ignorance and presumption are unspeakable" said the old myop. "The fact was known of course to every child; but it had never been proved experimentally in the laboratory; and



A number of scientific themes shaped the repertoire of the young Skinner. We identify these themes by the names attached to them. But of course, it is not the persons who matter but what they said. A certain commonality runs through their discourse whether that of Loeb or Pavlov—observe, find order, control the conditions of the subject matter. But these discourses differ as well—Loeb favored studying the whole organism; Pavlov specialized in surgical particularizing of the organism. Skinner rejected Pavlov's neural speculations and Loeb's tropisms but accepted their commonality in how to search for discernible relations in which one event is clearly a function of another. As well, other names, whether of small or large influence, also represent scientific and, as important, philosophical themes: for example, Russell, Watson, Crozier, Mach. This issue of Operants *addresses what Pavlov, the physiologist, contributed to Skinner in particular and therefore to behavioral science in general. Later issues will consider other contributors to our scientific heritage.*

> therefore it was not scientifically known at all. It reached me as an unskilled conjecture: I handed it on as science. Have you ever performed an experiment, may I ask?"
>
> "Several" said the black girl. "I will perform one now. Do you know what you are sitting on?"
>
> "I am sitting on a log grey with age, and covered with an uncomfortable rugged bark" said the myop.
>
> "You are mistaken" said the black girl. "You are sitting on a sleeping crocodile."
>
> With a yell which Micah himself might have envied, the myop rose and fled frantically to a neighboring tree, up which he climbed catlike with an agility which in so elderly a gentleman was quite superhuman.
>
> "Come down" said the black girl. "You ought to know that crocodiles are only to be found near rivers. I was only trying an experiment. Come down."
>
> But the elderly myop is unable to come down and begs the girl to perform another experiment.
>
> "I will" said the black girl. "There is a tree snake smelling at the back of your neck." The myop was on the ground in a jiffy.

It is clear that Shaw has caught the spirit of a science of behavior. The black girl is undeniably a good behavioral engineer. In two very neat examples of stimulus control she induces clearcut responses in the elderly myop. (His behavior does not, as we shall see later, exemplify the simple reflex, conditioned or otherwise.) But if the author is fully aware of the potentialities of the practical control of behavior, he is not so strong on theory, for the passage exemplifies a common misunderstanding regarding the achievement of science.

The facts of science are seldom entirely unknown "to every child." A child who can catch a ball knows a good deal about trajectories. It may take science a long time to calculate the position of a ball at a given moment any more exactly than the child must "calculate" it in order to catch it.

When Count Rumford, while boring cannon in the military arsenal in Munich, demonstrated that he could produce any desired amount of heat without combustion, he changed the course of scientific thinking about the causes of heat; but he had discovered nothing which was not already known to the savage who kindles a fire with a spinning stick or the man who warms his hands on a frosty morning by rubbing them together vigorously.

The difference between an unskilled conjecture and a scientific fact is not simply a difference in evidence. It had long been known that a child might cry before it was hurt or that a fox might salivate upon seeing a bunch of grapes.

What Pavlov added can be understood most clearly by considering his history. Originally he was interested in the process of digestion, and he studied the conditions under which digestive juices were secreted. Various chemical substances in the mouth or in the stomach resulted in the reflex action of the digestive glands. Pavlov's work was sufficiently outstanding to receive the Nobel Prize, but it was by no means complete. He was handicapped by a certain unexplained secretion. Although food in the mouth might elicit a flow of saliva, saliva often flowed abundantly when the mouth was empty. We should not be surprised to learn that this was called "psychic secretion." It was explained in terms which "any child could understand." Perhaps the dog was "thinking about food." Perhaps the sight of the experimenter preparing for the next experiment "reminded" the dog of the food it had received in earlier experiments.

But these explanations did nothing to bring the unpredictable salivation within the compass of a rigorous account of digestion.

Pavlov's first step was to control conditions so that "psychic secretion" largely disappeared. He designed a room in which contact between dog and experimenter was reduced to a minimum. The room was made as free as possible from incidental stimuli. The dog could not hear the sound of footsteps in neighboring rooms or smell accidental odors in the ventilating system. Pavlov then built up a "psychic secretion" step by step. In place of the complicated stimulus of an experimenter preparing a syringe or filling a dish with food, he introduced controllable stimuli which could be easily described in physical terms. In place of the accidental occasions upon which stimulation might precede or accompany food, Pavlov arranged precise schedules in which controllable stimuli and food were presented in certain orders. Without influencing the dog in any other way, he could sound a tone and insert food into the

dog's mouth. In this way he was able to show that the tone *acquired* its ability to elicit secretion, and he was also able to follow the process through which this came about. Once in possession of these facts, he could then give a satisfactory account of all secretion. He had replaced the "psyche" of psychic secretion with certain objective facts in the recent history of the organism.

The process of conditioning, as Pavlov reported it in his book *Conditioned Reflexes,* is a process of *stimulus substitution.* A previously neutral stimulus acquires the power to elicit a response which was originally elicited by another stimulus. The change occurs when the neutral stimulus is followed or "reinforced" by the effective stimulus. Pavlov studied the effect of the interval of time elapsing between stimulus and reinforcement. He investigated the extent to which various properties of stimuli could acquire control.

He also studied the converse process, in which the conditioned stimulus loses its power to evoke the response when it is no longer reinforced — a process which he called "extinction."

The quantitative properties which he discovered are by no means "known to every child." And they are important. The most efficient use of conditioned reflexes in the practical control of behavior often requires quantitative information.

A satisfactory theory makes the same demands. In dispossessing explanatory fictions, for example, we cannot be sure that an event of the sort implied by "psychic secretion" is not occasionally responsible until we can predict the exact amount of secretion at any given time. Only a quantitative description will make sure that there is no additional mental process in which the dog "associates the sound of the tone with the idea of food" or in which it salivates because it "expects" food to appear. Pavlov could dispense with concepts of this sort only when he could give a complete quantitative account of salivation in terms of the stimulus, the response, and the history of conditioning.

Pavlov, as a physiologist, was interested in how the stimulus was converted into neural processes and in how other processes carried the effect through the nervous system to the muscles and glands. The subtitle of his book is *An Investigation of the Physiological Activity of the Cerebral Cortex.* The "physiological activity" was inferential. We may suppose, however, that comparable processes will eventually be described in terms appropriate to neural events. Such a description will fill in the temporal and spatial gaps between an earlier history of conditioning and its current result. The additional account will be important in the integration of scientific knowledge but will not make the relation between stimulus and response any more lawful or any more useful in prediction and control. Pavlov's achievement was the discovery, not of neural processes, but of important quantitative relations which permit us, regardless of neurological hypotheses, to give a direct account of behavior in the field of the conditioned reflex. ●

On April 18, 1931, Skinner placed a rat into an experimental chamber and went for coffee. When he returned, he found that his food dispenser had jammed. He grabbed the rat's cumulative record and stared at it, stunned. Instead of suddenly stopping when no food appeared, the rat had run off "a beautiful extinction curve."

Skinner thought, "I had made contact with Pavlov at last!" How ironic! The curve he was examining began his break with Pavlov's reflex behavior. No antecedent stimulus produced each bar press. His rat's behavior was controlled by its postcedents. Skinner had discovered operant behavior and started a whole new science.

books

Order and Chaos: A Brief Review Of *Ivan Pavlov: A Russian Life in Science* by Daniel P. Todes

reviewed by Ron Allen, Ph.D., BCBA
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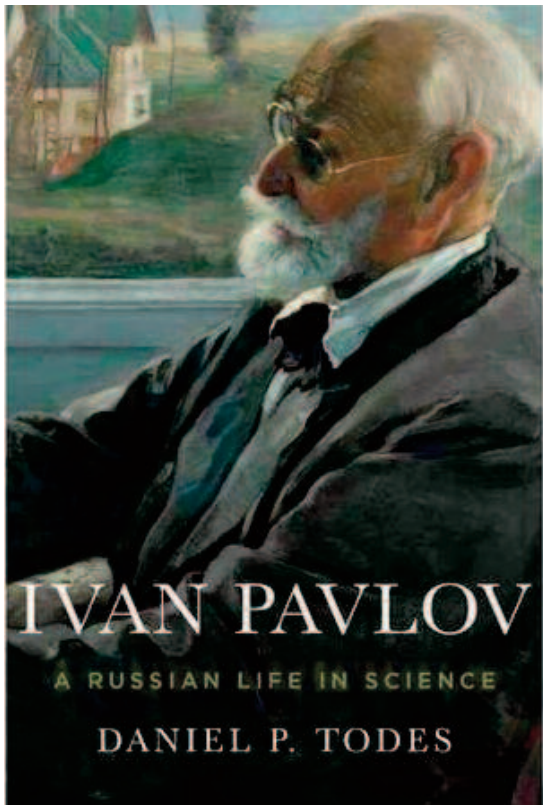

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When the food magazine jammed in Skinner's operant conditioning chamber, the cumulative graph of rat lever pressing displayed the first recording of operant extinction, the now well-known extinction curve. Skinner later wrote of the event "I had made contact with Pavlov at last." Through Daniel Todes' scholarly and surprisingly readable *Ivan Pavlov: A Russian Life in Science* we too are able to make enormous contact with Pavlov. After twenty years of research spanning the reading of official records, doctoral theses, lab reports, diaries, letters, personal interviews and more, Todes creates a portal into the variables controlling Pavlov's very human and inspiring scientific behavior. The photographs included are compelling. There is much here for students of either history or behavior.

Three areas stand out in the reading; Pavlov's relentless search for control and order, the never comfortable relation between science and government, and the interpretive analyses of human behavior based upon the regularity of the data from laboratory research. Finally, although not described by Todes, the parallels between the science and interpretive explorations of Pavlov and Skinner, the two giants of behavioral science, are remarkable.

Pravil'noe

Pavlov was born into a family of a priest in Ryazan, and in the family tradition he was sent to Seminary school. There he lost his faith, but discovered a love for science and pravil'noe (order and lawfulness). Pavlov imposed order broadly upon his life (his daily, weekly, annual schedules, for example), as well as to his laboratory procedures. He was a gifted surgeon, developing techniques to isolate living stomach tissue (pavlovian pouches) and isolated salivary ducts in living robust dogs allowing uncontaminated calibrated collection of secretions. Individuals from around the world came to St. Petersburg to study Pavlov's methods.

Skinner is acknowledged as the progenitor of the field of inquiry he termed the Experimental Analysis of Behavior (EAB). However, much of the procedural and analytical foundations of EAB Skinner would borrow from Pavlov; an operationally defined, repeatable response as the subject matter, whole and intact experimental subjects, single-subject design with repeated measurement, and experimental rather than statistical control over variance of the dependent variable. "Control your conditions and you will find order."

Science and Government

Ceremonial authority is always threatened by Science. In the time of the Tsars, science posed a serious challenge to the underlying assumptions of royal power: that there is an inborn immaterial "spiritual dimension of man", conferring a special status in nature, tying him to God and the moral authority of the royal lineage. Similarly, in the Stalin Reign of Terror, intellectuals were openly incarcerated and sent away to die. Pavlov was spared despite his open criticism of the government due to his international stature.

Data and Interpretation

Pavlov was first and foremost a Physiologist specializing in the neurological control of digestion. For his work on the physiology of digestion he was awarded the Nobel Prize in 1904. The study of elicited salivation (e.g., salivation produced by the presence of food or acid in the mouth) occurred as a component of the analysis of digestion. Salivation also occurred in response to the sight, smell, or other stimulation associated with food or acid presentation. Such salivation was termed "psychic salivation" by Pavlov. With the help of colleagues, Pavlov's research program came to focus almost exclusively on Psychic Secretions (then termed conditional reflexes) not as further study of digestion, but as the organism's adaptation to a changing environment. For Pavlov, the conditional reflex illustrated the interplay of excitation and inhibition generated in the cerebral cortex. His studies spanned the processes of acquisition, extinction, generalization, and discrimination of responding and more across dogs, monkeys, and humans.

Although a constant determinist, Pavlov was not a behaviorist in the sense of Watson's Methodological Behaviorism insisting that psychology should address only overt, publically observable behaviors. Instead, he sought to understand through natural science the emotional and subjective life of animals and humans, what he termed "the torments of our consciousness".

Pavlov and Skinner

Prior to his admission to graduate studies Skinner had read Pavlov's *Conditioned Reflexes: An investigation of the physiological activity of the cerebral cortex*. His reading had great effect. Like Pavlov, Skinner studied the well-defined behavior of "simple" intact organisms under conditions of precise experimental control. Both Pavlov and Skinner demonstrated functional relations between varied conditions and responding in their pursuit of prediction and control of behavior. Although Skinner would soon distinguish between operant and respondent behavior, focusing the majority of his research on the relationships between behavior and consequent environmental events rather than the effects of stimulus-stimulus contingencies, both he and Pavlov would go on to offer interpretive analyses of public and private behaviors in humans based upon their experimentally derived principles.

When Skinner was in graduate school at Harvard, the visiting Pavlov gave a guest lecture. Skinner asked Pavlov to sign the announcement of the lecture showing a picture of the great Russian scientist. Skinner kept the signed picture of Pavlov displayed in his workspace throughout his career. Different men in different worlds with the same mission. Although they were barely contemporaries, Pavlov and Skinner might be said to have jointly given birth to the ever-maturing science of behavior. ●

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books

A Discussion of Daniel Todes' book, *Ivan Pavlov: A Russian Life in Science*

By Robert W. Allan, Ph.D.
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Born and raised in New York City, Dr. Allan received his Ph.D. in Experimental Psychology at New York University, and completed a post-doc at the American Museum of Natural history. His research has often been focused on the operant-respondent interaction, using pigeons as experimental subjects. He presently teaches and researches at Lafayette College, in Easton, PA.

His methods were carefully behavioral, and his interpretations confidently dealt with the reflex as a way to the psychic and neurological. Finding his way through his research data, Pavlov concludes that the variability within, between, across many sessions, and between dogs, were the unaccounted pieces of the "psychic secretions". It appears that the "inner life" of the organism was of critical importance when he explored the conditional reflex, and argued that it was, "the substratum of elementary, pure representation, of a thought in the subjective world". He believed that he had discovered a method to explore the neurological and psychic processes — it was the Conditional Reflex (CR).

Daniel P. Todes' latest book, *Pavlov: A Russian Life in Science*, is the most detailed biography of the master researcher and Nobel prize winner, Ivan Pavlov. Biographical writing is interpretative at best, and Todes' book is no exception. However, previous biographies and those in text books were sketches of Pavlov's long and well researched career. Todes' book provide a thorough discussion of the life, education, and research of Pavlov.

In his discussion of Pavlov's research, Todes' message is clear — Pavlov always began with behavior as his subject matter; he then wanted to use the observed regularities to build models of "unseen processes in the higher nervous system that produced" the behavior. Pavlov chastised those that worked with him when they attempted to account for a conditional reflex with a "subjective account". The tautological nature of these "explanations" was probably clear to Pavlov (later, as Skinner said, naming a behavior doesn't give us the right to use the name as the cause). Pavlov wanted models of the nervous system grounded in a complete understanding of the variables that affected behavior

Although Todes's book covers the ups and downs, prizes and awards, speeches, and travel in Pavlov's life, this review will touch on two of Pavlov's critical sets of experimental studies, some of the terms that emerged from his research, how these ideas affected B. F. Skinner's research and discourse, and a brief discussion. Todes' book, and other interpretations of Pavlov's work, may help us understand the world that Skinner confronted when he began graduate school and his research at Harvard in the 1920's.

The Nobel Prize

Pavlov's Nobel Prize of 1904 was the first given to a Russian. His experiments involved the, "compelling description of a precise and integrated digestive system". In his experiments using dogs as experimental subjects, Pavlov surgically implanted fistulas in both the esophagus and in the stomach, allowing the collection of gastric secretions (measuring the type and amount). In many of these preparations, although the dogs could eat, chew, and swallow food, the food never arrived in the stomach — it was diverted to the esophageal fistula and out of the body. Pavlov showed that gastric secretions were released in the stomach even though food passed only through the esophagus. It was the stimulation of the mouth, tongue and esophagus, though previous "association" or pairing with eventual stimulation of the stomach (the events were associated in time and sequentially in place) that generated gastric secretions. This, and many other findings, suggested to Pavlov that food stimulating the stomach was not necessary to produce secretions, although it may be sufficient. His Nobel Prize made Pavlov a national hero in Russia, and post-revolution, in the Soviet Union.

This early work on the gastric reflex prompted Pavlov to continue investigating the predictive relation between stimuli that preceded food in the mouth or stomach. Pavlov's research would lead to the discovery of experimental procedures and results that would alter the path of psychological research.

The Conditional Response (CR) and Conditional Inhibition (CI)

Pavlov's basic finding was that after pairing a conditioned stimulus (CS) with an unconditioned stimulus (US) for several trials a conditional response (CR) to the CS would be observed, even when the CS was presented without a US (a probe trial). Pavlov also discovered that when the pairing is eliminated, CRs tend to extinguish, and the extinguished CS has the ability to reduce salivation to an excitatory CS. These "extinction" CSs were termed conditional inhibitors (CIs). Pavlov referred to this transfer of control to the CS as "stimulus substitution" — the CS was now serving as substitute for the US.

Pavlov also studied what he called "differentiation". Pairing a CS of 60 beats per minute with food until a CR is produced, and then presenting other CS speeds and not following these with the US resulted in the dog salivating only to 60 beats per minute. Pavlov had differentiated responding to a single CS.

Most of Pavlov's research remains relevant. Perhaps not as an account of all behavioral relations, but for the reflex relations his careful work inspires new, more complex behavioral research. Among the books that inspired Skinner to pursue his study of psychology was Pavlov's early work described in his book, *Conditioned Reflexes*. In this book Pavlov attempts to account for "higher nervous activity" using only careful experimental work on the reflex. This was a daunting task, but Pavlov was undeterred — his "'methodology of conditioned reflexes' as he commonly referred to it, constituted a new, objective method to study the brain, behavior, and the psyche." He believed his experimental research on reflex relations allowed him to conclude that dogs were "associating" the signal with the food, and that these associations were found in the higher nervous system. Alternatively, Skinner (who was inspired by Pavlov's early work) attempted to eliminate all associative speculations, by suggesting that all levels of behavior (from private to public) were products of the same behavior-environment interactions which he observed in his experimental work on the operant (reinforcement, punishment, stimulus control, and schedules). Although both Pavlov and Skinner studied environment-behavior interactions in excruciating detail, Pavlov was an associationist while Skinner was a behaviorist. Both Pavlov and Skinner, however, agreed that science would provide the necessary research tools to resolve these and other issues, Pavlov states:

> "Only science, exact science about human nature itself, and the most sincere approach to it by the aid of the omnipotent scientific method, will deliver man from his present gloom, and will purge him from his contemporary shame in the sphere of interhuman relations."

Skinner agrees, "Science is ... a search for order, for uniformities, for lawful relations among events in nature."

Pavlov began his work on the CR in 1903. He was a careful observer and experimentalist (although he wasn't always there when the work proceeded), and in his research reports provided readers with careful statements of

the results. The variability of his findings (within dogs and across sessions, and across dogs) troubled him. For Pavlov, any variability demanded more careful research methods. His work on the CR involved many types of conditional stimuli (CS) including "... an electronic buzzer, a harmonium, a metronome, a flashing light, and electrical shock." Todes also indicates that Pavlov chose these stimulus sources because experimenters should,"... control precisely the duration and qualities of any stimulus". Early in his career, Skinner was also involved in the discussion of the conditional response. Responding to an article by Konorski (who had worked with Pavlov) and Miller proposing two types of the CR (Type I or Type II), Skinner offered the operant as the type of behavior sensitive to its consequences, while Pavlov's type of behavior was elicited by a stimulus. Pavlov was initially resistant to the proposed second type of CR, but after replicating the findings in his lab, he admitted it was a useful designation — he called this type of responding a, "conditional, associational process." After this admission, he began work on "volitional" CRs, systematicity, and dynamic stereotypes. He never recognized Skinner's approach to the analysis of behavior-environment relations.

The pairing of a CS with an unconditional stimulus (US; e.g., food in the mouth) yielded CRs that presumably allowed Pavlov to, "view his achievement as the transformation of this familiar 'psychic secretion' into a reliable experimental phenomenon - the conditional reflex - and its use as a method for understanding the unseen processes in the brain that produce thoughts, emotions, and behaviors." Todes points out that Descartes, de La Mettrie, and Sechenov proposed similar approaches prior to Pavlov's work. One of Pavlov's students, B. P. Babkin, who would write a detailed biography of Pavlov, pointed out that others had also proposed similar approaches, including Magendie, Bernard, Darwin, and Bain.

Later on in his career, Pavlov also tipped his researcher's hat to Edward L. Thorndike's findings that preceded Pavlov's work,

"Some years after the beginning of the work with our new method I learned that somewhat similar experiments on animals had been performed in America, and indeed not by physiologists but by psychologists. Thereupon I studied in more detail the American publications and now I must acknowledge that the honour of having made the first steps along this path belongs to E. L. Thorndike. By two or three years his experiments preceded ours, and his book must be considered as a classic, both for its bold outlook on an immense task and for the accuracy of its results."

Pavlov, however, missed the operant nature of Thorndike's puzzle box studies. Later in his career, following his work with chimpanzees Rafael and Roza, Pavlov did begin to accept the second type of conditioning described by Konorski (see above). Perhaps, with a few more experiments, and more time to consider Skinner's account and experimental results, Pavlov would have become a radical behaviorist.

Terms used by both Pavlov and Skinner

After Pavlov's work on the CR (and CI), Skinner adopted this terminology — he wrote about Pavlov's contributions, discussing the CSs, USs, and CRs and how these experimental findings help us better understand and control basic reflexive behavior. Pavlov also used the word "reinforcement" to talk about the effect of the US on establishing the CS-US bond. Skinner also adopted the word "reinforcement", but redefined it as a class of consequences that followed a response, and increased the likelihood of that response. Skinner also adopted the word "differentiation", but redefined it in operant terms as the selection by reinforcement of responding from a behavioral repertoire. Todes suggests that Pavlov's view was antithetical to early behaviorist views. He stresses Pavlov's belief in "psychic secretions" and that Pavlov wanted to merely define the underlying neurophysiological processes of each "psychic secretion". Skinner suggested that Pavlov was trying to eliminate these secretions, "Pavlov's first step was to control conditions so that "psychic secretion" largely disappeared." Todes, on the other hand, offers some of Pavlov's prose that suggests he believed in inner processes (e.g., describing the dogs as "wanting" food, "expecting" food, was "self-possessed", etc.), but at the neural level.

"... he reasoned from 'objective' physiological processed to 'subjective' psychic phenomena. (As opposed, for example, to 'subjective' psychological methodologies that reasoned from postulates about the animal's 'internal, subjective world)."

It's not always clear what Todes means by the dif-

ferences between Pavlov and "the behaviorists of his day." Although Pavlov may have used "cognitive" terms to speak of his dogs, so did many of the early behaviorists (e.g., Tolman and his students). Pavlov's methods were behavioral but his interpretations were mental or neurological. Later in his life when working with chimpanzees Rafael and Roza, he began exploring Kohler's notion of "insight". Eventually, he rejected Kohler's "insight" account and instead developed an account of the accumulation of CRs related to problem solving. His experiments and conclusions were very much like the Columban Simulation experiments in Skinner's laboratory in the 1980's.

Today, many psychologists work with an approach to research that resembles Pavlov's — they collect behavioral data and interpret the data as evidence for "cognitive processes" or "mental processes" or "neurological causes," but they often begin with assumptions about underlying "cognitive or neurological processes" (so-called "hypotheses"). Many of the behaviorists of Pavlov's day also worked in a similar fashion (e.g., Clark Hull, Edward Tolman, Edwin Guthrie). Along with John Watson, Skinner was among the first to drop the concept of inner "cognitive processes", and to offer an account that was entirely behavioral — one of his main assumptions was that both humans and animals are behaving organisms, so thinking, feeling, emoting, and fearing are behavior engaged in rather than constructs possessed. These terms should be verbs (action terms) rather than nouns (things to be examined). Is the neurology involved? Of course, but only as part of, rather than apart from, or causal of, behavior.

Discussion

Pavlov's experimental history is all about determined, careful work in the laboratory. His written accounts are clear and concise, and his contributions to behavioral research are among the best. He provided us with a method to examine some of the most basic, elemental properties of both the reflex and the conditioned reflex. As Skinner might have said, Pavlov contributed to the prediction and control of behavior. Although Skinner adopted some of Pavlov's terms, he explored another dimension of behavior — events which follow (rather than precede) behavior. Both approaches work — changes to the environment alter the likelihood of behavior. Indeed, many responses are maintained by some combination of reflexive and operant relations.

Thank you, Daniel P. Todes, for a magnificent book. After reading the book, Pavlov would probably have engaged in a blushing reflex! ●

Essentially only one thing in life interests us: our psychical constitution, the mechanism of which was and is wrapped in darkness. All human resources, art, religion, literature, philosophy and historical sciences, all of them join in bringing lights in this darkness. But man has still another powerful resource: natural science with its strictly objective methods. This science, as we all know, is making huge progress every day. The facts and considerations which I have placed before you at the end of my lecture are one out of numerous attempts to employ a consistent, purely scientific method of thinking in the study of the mechanism of the highest manifestations of life in the dog.

— Ivan Petrovich Pavlov
"Physiology of Digestion", Nobel Lecture (December 12, 1904)

One can truly say that the irresistible progress of natural science since the time of Galileo has made its first halt before the study of the higher parts of the brain, the organ of the most complicated relations of the animal to the external world. And it seems, and not without reason, that now is the really critical moment for natural science; for the brain, in its highest complexity—the human brain—which created and creates natural science, itself becomes the object of this science.

— Ivan Petrovich Pavlov
Natural Science and Brain (1909)

science corner

On the Science of Examining the Products of Private Events

commentary by Darlene E. Crone-Todd, Ph.D.
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Portuguese translation by Bruna Colombo dos Santos

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It is often the case that as behavior analysts, we are accused of denying private events. By private events, of course, we refer to what most people call *thinking, feeling, and emotion*. During the 20th century, the work of many influential scientists emphasized the relationship between the environment and publicly viewable behavior, such as Pavlov, Watson, and Skinner. Both Pavlov and Watson studied unconditioned and conditioned reflexes, developing the science known as respondent, or classical conditioning. While Pavlov may "ring a bell" for his work on the salivatory response to auditory stimuli, Watson extended that science to the development of emotional responses, including the fear response. These physiological responses, then, were studied in terms that relate environmental stimuli to their elicited physiological responses, and showed that paired events could lead to otherwise neutral stimuli coming to control these physiological responses.

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É caso frequente que como analistas do comportamento, nós somos acusados de negar eventos privados. Por eventos privados, é claro, nós nos referimos ao que a maioria das pessoas chama de *pensamento, sentimento e emoção.* Durante o Século 20, o trabalho de muitos cientistas influentes enfatizou a relação entre o ambiente e comportamento publicamente observável, tais como Pavlov, Watson e Skinner. Tanto Pavlov quanto Watson estudaram reflexos incondicionados e condicionados, desenvolvendo a ciência conhecida como condicionamento respondente, ou clássico. Enquanto Pavlov pode "tocar um sino" para seu trabalho sobre resposta salivar a um estimulo auditivo, Watson estendeu esta ciência ao desenvolvimento de respostas emocionais, incluindo a resposta de medo. Essas respostas fisiológicas, então, foram estudadas em termos que relacionavam estímulos ambientais a suas respostas fisiológicas eliciadas, e mostrou que eventos emparelhados poderiam levar outros estímulos neutros a controlar essas respostas fisiológicas.

When Skinner embarked on his study of psychology, he was confronted by the work of previous experimental psychologists in cognitive areas, as well as of these early behaviorists. Freud heavily influenced the emerging clinical emphasis in the discipline at that time. As Skinner's work and theories evolved, his work on the operant response, and on schedules of reinforcement, clearly established his presence as a serious scientist in the field. This early work also laid the foundation for his later contributions in which he could communicate his thinking about how the research could inform both experimental research and applied work. Hence, his books *Science and Human Behavior* and *Verbal Behavior* both include relevant research and extensions to theoretical and conceptual behavior analysis that led to later developments in the field.

As Skinner and those who followed him in the discipline continued to work and develop the science and its applications, there have been great strides to improve the lives of both human and non-human animals. There is, of course, much to be done. In this paper, the goal is to focus on one area of interest to behavior analysis: "conceptual", "critical", or "higher-order" thinking.

In *Verbal Behavior*, Skinner devoted a chapter to the topic of thinking. He discussed how understanding the behavior of the scientist not only included an account of how the environment shaped his or her physical, bodily actions and verbal behavior (i.e., their public behavioral repertoire), but also their private behavior. There are a number of behaviorists who have continued his early theoretical work, and have studied the stimuli, context, and behavior underlying conceptual development and complex thinking. (For example, anyone who wishes to read more regarding conceptual behavior analysis of language, cognition, and verbal relations should look at the works of Marc Branch, Phillip Chase, Linda Hayes, Kent Johnston, Steven Hayes, T. V. Joe Layng, Jay Moore, Hayne Reese, Masaya Soto, and many others who have published in this area.)

One of the difficulties in conducting work in this area is that the private operant behavior involved is so hard to study. Instead, what we are able to study are the products of private behavior. Consider, too, that we already know that what people say and what they do can be different. This is often the case because our verbal behavior comes under different contingencies than the actual behavior at the time.

Quando Skinner embarcou no seu estudo da psicologia, ele foi confrontado pelo trabalho em áreas cognitivas de psicólogos experimentais prévios, assim como por estes primeiros behavioristas. Freud influenciou fortemente a emergência da ênfase clínica na disciplina naquele período. Conforme o trabalho e as teorias de Skinner evoluíram, seu trabalho sobre a resposta operante e sobre esquemas de reforçamento, claramente estabeleceu sua presença como um cientista sério na área. Seu trabalho inicial também lançou base para suas contribuições posteriores nas quais ele pode comunicar seu pensamento sobre como a pesquisa poderia informar tanto a pesquisa experimental e o trabalho aplicado. Então, seus livros *Ciência e Comportamento Humano* e *Comportamento Verbal*, ambos incluíram pesquisa relavante e estensões para análise teórica e conceitual do comportamento que levaram a desenvolvimentos posteriores no campo.

Como Skinner e aqueles que o seguiram na disciplina continuaram a trabalhar e desenvolver a ciência e suas aplicações, grandes passos em direção à melhora das vidas de animais humanos e não-humanos foram dados. Existe, é claro, muito a ser feito. Nesse artigo, a meta é focar sobre uma área de interesse da análise do comportamento: pensamento "conceitual", "crítico", ou "de ordem superior".

No *Comportamento Verbal,* Skinner dedicou um capítulo ao tópico do pensamento, e discutiu como a compreensão do comportamento do cientista não apenas incluía uma formulação sobre como o ambiente modelou suas ações corporais físicas e comportamento verbal (p. ex., seu repertório comportamental público), mas também seus eventos privados. Há um número de behavioristas que continuaram seu trabalho teórico inicial, e tem estudado os estímulos, contexto, e comportamento subjacentes ao desenvolvimento conceitual e pensamento complexo. (Por exemplo, qualquer um que deseje ler mais a respeito da análise comportamental conceitual da linguagem, cognição, e relações verbais deveria olhar os trabalhos de Marc Branch, Phillip Chase, Linda Hayes, Kent Johnston, Steven Hayes, T. V. Joe Layng, Jay Moore, Hayne Reese, Masaya Soto, e muitos outros que tem publicado nesta área.)

Uma das dificuldades em conduzir trabalhos nessa área é que o comportamento operante privado envolvido é muito difícil de estudar. Ao invés disso, o que nós somos capazes de estudar são os produtos do comportamento privado. Considere, também, que nós já sabemos que o que as pessoas

science corner

During the years in which I have studied higher order, or complex, thinking skills at the university level, it is also apparent that what one thinks is not always what ends up on paper. Sometimes what one thinks is much more complex than what ends up on paper because one lacks the skill, time, or some other set of factors that can contribute to successfully producing written text that has a positive effect on the reader. Another reason, of course, is that what is complex must be broken down into smaller units of textual behavior so that the reader can understand what is written. At other times, the produced written text is much more complex than what the reader can understand. In these cases, we can think about how the task and the produced behavior "match up". In other words, I am suggesting that we consider thinking about thinking in the following way:

> A task analysis of what is required needs to be undertaken
> A set of criteria which clearly identify the task components
> A statement on how, and in which ways, the various task components need to be coordinated to produce a set of responses that meet the requirements of the task

Essentially, by conducting "task analyses" of a problem to be solved, a question to be answered, and so on, we can better specify what types of behavior must be engaged in to meet the requirements of the task. Of course, some tasks are more complex than others. Consider that Skinner (in *Verbal Behavior*) wrote about how scientists engage in their very complex physical and conceptual behaviors. It seems that the behavior of scientists involves both respondent and operant conditioning that results in how they think, act, and react in the context of their discipline. Whether we are talking about scientists or practitioners in our own field, or other people in other fields, the fruits of such an endeavor would have a major impact on not only education and training, but also on personal development for individuals.

Skinner was ahead of his time in so many ways, and particularly with respect to the development of teaching machines. At the time that he was developing these machines for use in elementary schools, Keller was devel-

dizem e o que elas fazem podem ser diferentes. Este é frequentemente o caso porque nosso comportamento verbal está sob contingências diferentes daquelas que controlam o comportamento em curso no momento. Durante os anos nos quais eu estudei habilidades de ordem superior, ou pensamento complexo em nível universitário, também foi evidente que o que alguém pensa não é sempre o que acaba sendo colocado no papel. Às vezes o que alguém pensa é muito mais complexo do que o que acaba no papel porque falta habilidade, tempo ou algum outro conjunto de fatores que podem contribuir para produzir de maneira bem sucedida um texto escrito que tenha um efeito positivo sobre o leitor. Outra razão, é claro, é que o que é complexo precisa ser quebrado em unidades menores de comportamento textual de forma que o leitor possa entender o que está escrito. Em outros momentos, o texto escrito produzido é muito mais complexo do que o leitor pode entender. Nesses casos, nós podemos pensar sobre como a tarefa e o comportamento produzido se "correspondem". Em outras palavras, eu estou sugerindo que nós consideremos pensar sobre o pensamento da seguinte maneira:

> Uma análise de tarefa do que está sendo exigido tem que ser feita
> Um conjunto de critérios que claramente indentificam os componentes da tarefa
> Deve ser dito como, de que maneiras, os vários componentes da tarefa precisam ser coordenados para produzir um conjunto de respostas que atinge as exigências da tarefa.

Essencialmente, ao conduzir a "análise de tarefas" de um problema a ser resolvido, uma questão a ser respondida, e assim por diante, nós podemos especificar melhor que tipos de comportamento devem estar envolvidos para que a exigência da tarefa seja cumprida. É claro, algumas tarefas são mais complexas do que outras. Considere o que Skinner (no *Comportamento Verbal*) escreveu sobre como cientistas se engajam nos seus comportamentos complexos físicos e conceituais. Parece que o comportamento dos cientistas envolve tanto conditionamento operante quanto respondente que resulta em como eles pensam, agem, e reagem ao contexto de sua disciplina. Se nós estamos falando sobre cientistas ou profissionais no nosso próprio campo, ou outras pessoas em ou-

oping and making popular the use of the mastery-based personalized system of instruction (PSI). These early adoptions of using reinforcement to build the behavioral repertoires of students' written behavior were met with resistance on many fronts. For example, the higher grades attained by using criterion-based grading were frowned upon by many administrators who preferred a "wheat from chaff" approach to grading. In past few decades, there has been a shift in higher education toward an emphasis on higher completion rates for undergraduates. At the same time, there is an increased need for graduates of master's and doctoral programs. It seems like the time has arrived to finally realize the promise of using behavioral principles and procedures to make mastery-based learning more likely and to develop complex behaviors on the part of students.

In previous decades, one of the barriers to this type of work was in keeping good records and developing systems that could be easily used by others. As an example, the clear effectiveness of Keller's PSI, which uses small units of studies with clearly specified objectives, fell out of favor because of the extensive administrative work needed to carry out. Simply put: The response cost on the part of the instructor was too great compared to the reinforcement in terms of student progress.

One important remedy to overcome the response cost related to the administrative tasks has been the development of computers to aid in the use of PSI. For example, the work by Joseph Pear and his colleagues at the University of Manitoba on computer-aided PSI (CAPSI) has provided many of us with the opportunity to use CAPSI as a *virtual* laboratory to study the development of higher-order, or complex, thinking behavior. What is exciting about the development of such online systems is that they can help realize the types of advances that Skinner started developing and writing about in *The Technology of Teaching*. Essentially, behavior-analytic computer, internet, and mobile applications are helping lead the way into the 21st century realization of how to more effectively teach the very skills that are necessary to continue the important work in not only

tros campos, os frutos de tal empreendimento deveriam ter um maior impacto não apenas na educação e treinamento, mas também no desenvolvimento pessoal para os indivíduos.

Skinner estava a frente de seu tempo de muitas formas, e particularmente com respeito ao desenvolvimento das máquinas de ensinar. No período em que ele estava desenvolvendo essas máquinas para uso em escolas elementares, Keller estava desenvolvendo e tornando popular o uso do sistema personalizado de instrução (PSI) baseado em etapas. Essas adoções iniciais do uso de reforçamento para construir repertórios de comportamento escrito nos estudantes encontraram resistência em muitas frentes. Por exemplo, as notas mais elevadas alcançadas por meio de uma classificação baseada em critérios foram desaprovadas por muitos administradores que preferiam uma abordagem de classificação do tipo "joio do trigo". Nas últimas décadas, houve uma mudança na educação superior em direção taxas altas de conclusão para graduação. Ao mesmo tempo, existe uma necessidade crescente de pós-graduados em programas de mestrado e doutorado. Parece que é chegado o tempo de finalmente realizar a promessa de usar os princípios comportamentais e procedimentos para tornar a aprendizagem baseada em etapas mais provável e desenvolver comportamentos complexos por parte dos estudantes

Em décadas anteriores, uma das barreiras a este tipo de trabalho era a manutenção de bons registros e desenvolvimento de sistemas que poderiam facilmente ser utilizados por outros. Como um exemplo, a clara efetividade do PSI desenvolvido por Keller, que usa pequenas unidades de estudo com objetivos claramente especificados, caiu em desuso por conta do extenso trabalho administrativo necessário para o exercício da docência. Colocado de maneira simples: O custo de resposta por parte do instrutor era muito grande comparado ao o reforçamento em termos do progresso do estudante.

Uma remediação importante para superar o custo de resposta relacionado a tarefas administrativas tem sido o desenvolvimento de computadores para auxílio no uso do PSI. Por exemplo, o trabalho de Joseph Pear e seus colegas na Universidade Manitoba sobre PSI com auxílio computacional (CAPSI) proporcionou a muitos de nós a oportunidade de usar CAPSI como um laboratório *virtual* para estudar o desenvolvimento do comportamento de pensar de ordem superior, ou complexo. O que é empolgante sobre o desenvolvimento destes sistemas on-line é que eles podem ajudar a colocar em prática os tipos de avanços que Skinner começou a desenvolver e escrever sobre no *Tecnologia do Ensino.* Essencialmente, computação analitico comportamental, internet e aplicações móveis estão ajudando a orientar o caminho para a relização do século 21 de como

behavioral science, but other fields as well.

With the advent of internet-based applications, behavioral approaches to education have begun to fully realize the potential of experimental and applied work first developed by Skinner and others. In my own work with Joseph Pear at the University of Manitoba, we were able to develop and optimize the use of CAPSI as a kind of educational laboratory. Over the years, several of us who have used CAPSI and similar programs, have determined that clear instructional goals and objectives provide cues for students' verbal repertoire, and that the type of feedback provided is important for shaping, fading, and developing chains of intraverbal behavior on the part of students. However, the archived textual responses that Toby Martin and his colleagues have studied in CAPSI suggest that despite some intensive feedback on the part of instructors, proctors, or fellow students, it is often the case that student writers will not always incorporate feedback. It seems clear that one area that needs to be studied, then, is how to increase both the effectiveness of the feedback and compliance with that feedback. The work of Julie Vargas in developing clear instructional goals and objectives would be of great benefit here to develop a task analysis to break down objectives that seem too complex for students to master, even with effective feedback.

During my own work with CAPSI, I have benefited greatly from developing an understanding of instructional goals and objectives, and also sought a way to more reliably measure higher-order, or complex thinking behavior. Our early work in this area (published with Joseph Pear, Cynthia Read, Kirsten Wirth, and Heather Simister) incorporated the use of a taxonomy developed by Benjamin Bloom, which is used ubiquitously in education. This taxonomy included categories such as Knowledge, Comprehension, Application, Analysis, Synthesis, and Evaluation. The taxonomy has been written about extensively in the literature, and adopted by many educators at various level of instruction. However, we found that the taxonomy as written and explained in the literature lacks important reliability and validity in our research. We were successful in re-defining the categories and in creating flowcharts to better teach these categories, which resulted in higher inter-scorer reliability for some

ensinar de forma mais eficaz as habilidades necessárias para continuar o trabalho importante não só na ciência comportamental, mas também em outros campos.

Com o surgimento de aplicações baseadas na internet, abordagens comportamentais para educação começaram a entender completamente o potencial do trabalho experimental e aplicado, desenvolvido inicialmente por Skinner e outros. Em meu próprio trabalho com Joseph Pear na Universidade de Manitoba, nós fomos capazes de desenvolver e otimizar o uso do CAPSI como um tipo de laboratório educacional. Durante os anos, muitos de nós que usamos o CAPSI e programas similares, determinamos que metas e objetivos instrucionais claros fornecem dicas para o respertório verbal do estudante e que o tipo de *feedback* fornecido é importante para modelar, esvanecer, e desenvolver cadeias de comportamento intraverbal por parte dos estudantes. Entretanto, as respostas textuais arquivadas que Toby Martin e seus colegas têm estudado no CAPSI sugerem que a despeito de algum *feedback* intensivo por parte dos instrutores, monitores, ou colegas, é frequente o caso em que estudantes escritores nem sempre irão incorporar o *feedback*. Parece claro que uma área que precisa ser estudada, então, é como aumentar tanto a efetividade do *feedback* quanto a conformidade com esse *feedback*. O trabalho de Julie Vargas em desenvolver metas e objetivos instrucionais claros seria de grande benefício aqui para desenvolver uma análise tarefas que torne possível quebrar objetivos que parecem muito complexos para estudantes dominarem, mesmo com *feedback* efetivo.

Durante meu trabalho com CAPSI, eu me beneficiei muito de ter desenvolvido uma compreensão das metas e objetivos instrucionais, e também busquei um caminho para medir de forma mais fidedigna o comportamento de pensar de ordem superior, ou complexo. Nosso trabalho inicial nessa área (publicado com Joseph Pear, Cynthia Read, Kirsten Wirth, e Heather Simister) incorporou o uso da taxonomia desenvolvida por Benjamin Bloom, que é usada ubiquamente na educação. Esta taxonomia inclui categorias como Conhecimento, Compreensão, Aplicação, Análise, Síntese, e Avaliação. Tem se escrito extensivamente sobre a taxonomia na literatura, e ela tem sido adotada por muitos educadorem em vários níveis de instrução. Entretanto, nós encontramos que a taxonomia da maneira como está escrita e explicada na literatura carece de confiabilidade e validade imporantes em nossa pesquisa. Nós fomos bem sucedidos em redefinir as categorias e em criar fluxogramas para melhor ensiná-las, que resultou em concordân-

(but not all) of the taxonomy. We also faced criticism about the categories, as we had to contend with the problem of more or less difficult (or complex) examples of each of the categories (e.g., more or less difficult comprehension tasks, etc.).

During the past decade, I started working with a Model of Hierarchical Complexity (MHC). I have to admit that I resisted this model at first because it sounded so cognitive, and I honestly thought it was another model that provided general summary labels instead of behavioral objectives. It turned out that I was wrong about this initial assumption. The MHC, as currently developed by Michael Commons at Harvard University, has many features that should be of interest to behavior analysts studying in this area. First, one must separate the analysis of the task from the performance of the behavior. So, one must do the task analysis, and then determine whether or not the behavior of the individual does or does not meet the task requirements. This means that the behavior of the individual can be less complex, ideally complex, or more complex, than that of the specified task. For instance, one could ask a student to define reinforcement and give an example. The student's textual response could vary from (a) not providing an adequate definition or example (under-matching); (b) providing an appropriate definition and example (match); or (c) providing a definition or example that includes additional relevant information, explanation, or comparison (over-matching). Of course, it is also possible for a student to answer a completely different question that was not asked, which would be a non - scoreable behavior, possibly classified as a more serious example of under-matching.

The work using the MHC has revealed the following to me. First, that using it yields much higher inter-observer agreement (IOR) values (85% or higher) between independent raters than we achieved in the earlier work with Bloom's taxonomy. This means that it meets an important scientific criterion of reliability. Second, when we analyze the instructional tasks in my courses and across our department curriculum, there is a clear negative relationship between the complexity of the tasks and the extent to which students under-match, match, or over-match the tasks. In other words,

cias entre avaliadores mais altas para alguma parte (mas não toda) da taxonomia. Nós também enfrentamos críticas sobre as categorias, assim como tivemos que lidar com o problema de exemplos de maior ou menor dificuldade (ou complexidade) de cada uma das categorias (p. ex., tarefas de compreensão mais ou menos difíceis, etc.).

Durante a última década, eu comecei a trabalhar com um modelo de complexidade hierárquica (MHC). Eu tenho que admitir que eu resisti a este modelo de início porque ele soava muito cognitivista, e eu honestamente pensei que era outro modelo que forneceria rótulos resumidos gerais ao invés de objetivos comportamentais. Aconteceu que eu estava errada sobre essa suposição inicial. O MHC, como atualmente desenvolvido por Michael Commons na Universidade de Harvard, tem muitas características que deveriam ser de interesse dos analistas do comportamento que estão estudando esta área. Primeiro, é preciso separar a análise da tarefa da perfomance do comportamento. Então, é preciso fazer a análise da tarefa, e depois determinar se o comportamento do indivíduo cumpre ou não os critérios de exigência da tarefa. Isso significa que o comportamento do indivíduo pode ser menos complexo, idealmente complexo, ou mais complexo, do que o que foi especificado na tarefa. Por exemplo, poderia ser pedido ao estudante para definir reforçamento e dar um exemplo. A resposta textual do estudante poderia variar de (a) não fornecer uma definição adequada ou exemplo (correspondência inferior); (b) forncecer uma definição apropriada e exemplo (correspondência); ou (c) fornecer definição ou exemplo que inclui informação adicional relevante, explicação ou comparação (correspondência superior). É claro, também é possível para um estudante responder a uma questão completamente diferente que não foi perguntada, que seria um comportamento não-pontuável, possivelmente classificado como um exemplo mais sério de correspondência inferior.

O trabalho usando o MHC revelou o seguinte para mim. Primeiro, que usá-lo produz valores muitos maiores de IOR (concordância entre observadores – 85% ou mais) entre avaliadores independentes do que foi produzido no trabalho inicial com a taxonomia do Bloom. Isso significa que ele cumpre um critério científico importante de confiabilidade. Segundo, quando nós analisamos as tarefas instrucionais nos meus cursos e através do currículo do nosso departamento, existe uma clara relação negativa entre a complexidade das tarefas e a extensão na qual estudantes produzem correspondência inferior, correspondência, ou correspondência superior. Em outras palavras, conforme a tarefa

as the tasks increase in complexity, the evoked textual behavior typically scores much lower on written papers and exams. This has led me to teach both my undergraduate and graduate courses in different orders than I used to, and to developing more supports in those courses that are faded out over time.

One of the major problems with the adoption of the MHC is its very complexity. It is not an easy system of classification to teach to others. However, our recent work is demonstrating that the use of SAFMEDS (Say All Fast Minute Each Day Shuffled) can be effectively used to teach the model. In the workshops that I have given over the past year or so, the feedback that I have received from the community has been very positive about this model. One of the reasons I keep hearing and observing, is that there is often a great difference in the complexity of physical and conceptual behavior between: (a) professors and students; (b) behavior analysts in the field and incoming specialists who are just starting their training; and (c) our professionals and other professionals with whom we interact. What has been reported back to me at the end of the workshops is that the attendees are finding this useful for an analysis of their own complex repertoires, the repertoires of others with whom they are engaging in verbal behavior, and how to "bridge the gap" by providing more support that is eventually faded out.

One point about all of this work that should be apparent to any behavior analyst who uses PSI or SAFMEDS is this: both of these methods can be used to teach complex repertoires. If set up correctly, a sequence of increasingly complex tasks can be designed, and reinforcement can be provided in various forms (e.g., praise, tracking one's own progress, etc) to shape the complex repertoires. I am currently using SAFMEDS in both my undergraduate behavior analysis and research methods courses, and the students have been expressing great interest in continuing to use these approaches independently in their other classes. This suggests that using them provides enough natural reinforcement that generalization is very likely.

A recent development is using CAPSI and the MHC to develop teaching methods related to working with clients with autism and developmental disabilities. In my work with Celso Goyos and his students at the

aumenta em complexidade, o comportamento textual evocado tipicamente tem pontuações muito mais baixas em trabalhos escritos e exames. Esta situação me levou a ensinar tanto meus cursos de graduação e pós-graduação em ordens diferentes do que eu estava acostumada, e a desenvolver mais suportes nesses cursos que vão sendo esvanecidos ao longo do tempo.

Um dos maiores problemas com a adoção do MHC é sua complexidade. Não é um sistema fácil de classificação para ensinar os outros. Entretanto, nosso trabalho recente é demonstrar que o uso do SAFMEDS (*Say All Fast Minute Each Day Shuffled*) pode ser efetivo para ensinar o modelo. Em oficinas que eu ministrei durante o ano passado ou assim, o *feedback* que eu recebi da comunidade tem sido muito positivo sobre este modelo. Uma das razões pela qual eu me mantenho ouvindo e observando, é que existe uma grande diferença na complexidade do comportamento físico e conceitual entre: (a) professores e estudantes; (b) analistas do comportamento no campo e especialistas iniciantes que acabaram de começar seu treinamento; (c) nossos profissionais e outros profissionais com quem interagimos. O que tem sido me relatado ao final das oficinas é que os participantes estão achando isto útil para análise do seu próprio repertório complexo, para os repertórios de outros com quem eles estão engajados em comportamento verbal, e para "completar a lacuna" fornecendo mais suporte que eventualmente será retirado de forma gradual.

Um ponto sobre todo este trabalho que deveria ser aparente para qualquer analista do comportamento que usa PSI ou SAFEMEDS é este: Ambos os métodos podem ser utilizados para ensinar repertórios complexos. Se configurado corretamente, uma sequência de tarefas cada vez mais complexas pode ser planejada, e reforçamento pode ser fornecido de várias formas (p.ex., elogio, monitoramento de progresso, etc) para modelar repertórios complexos. Eu estou usando atualmente o SAFMEDS nos meus cursos de graduação de análise do comportamento e de métodos de pesquisa, e os estudantes tem expressado grande interesse em continuar a usar estas abordagens independentemente em suas outras aulas. Isso sugere que ao usá-las reforçamento natural suficiente é fornecido de forma que a generalização é bastante provável.

Um desenvolvimento recente é usar o CAPSI e o MHC para desenvolver métodos de ensino relacionados a clientes com autismo e outras desordens do desenvolvimento. No meu trabalho com Celso Goyos e seus estudantes na Universidade Federal de São Carlos (UFSCAR), nossas populações alvo são

Universidade Federal de São Carlos (UFSCAR; the federal university in Sao Carlos, Brazil), our target populations are practitioners and caregivers in Brazil. What is exciting about this program of research is that if it is successful, we will be placing the technology involved in applied behavior analysis in the hands of people who need it most. To us, this would be a successful use of experimental science and of its application.

As Skinner put it, people are willing to listen to what they are ready to hear. As behavior analysts, we will do better at training the next generation of scientists and at communicating with our colleagues in other disciplines, if we consider how to engage in complex thinking together. This includes not only how to get others to understand us, but how we can understand them. It takes a verbal community to develop complex verbal repertoires, and it will take a community with complex scientific skills to solve the complex problems that face us in the 21st century and beyond. ●

profissionais e cuidadores no Brasil. O que é empolgante sobre esse programa de pesquisa é que se ele for bem sucedido, nós estaremos colocando a tecnologia envolvida na análise aplicada do comportamento nas mão das pessoas que mais precisam. Para nós, isso seria um uso bem sucedido da ciência experimental e suas aplicações.

Assim como Skinner colocou, as pessoas estão dispostas a ouvir o que elas estão prontas para ouvir. Como analistas do comportamento, nós faremos melhor em treinar a próxima geração de cientistas e em nos comunicar com nossos colegas de outras disciplinas, se nós considerarmos como nos engajar no pensar complexo juntos. Isso inclui não apenas como conseguir que os outros nos compreendam, mas como nós podemos compreende-los. É preciso uma comunidade verbal para desenvolver repertórios verbais complexos, e será preciso uma comunidade com habilidades científicas complexas para resolver problemas complexos que nós enfrentamos no Século 21 e além. ●

About the Translator:

Bruna Colombo dos Santos has a degree in Psychology from State University of Londrina (UEL) in Brazil. During her degree, she worked with applied research in behavior analysis, focusing on children who presented oppositional defiant disorder and their relationships with parents or caregivers. Because of the contact with parental practices and their effects on children's behavior, she became interested in aversive control and started to study theoretical aspects of punishment. She has a Masters degree from the Program of Graduate Studies in Experimental Psychology: Behavior Analysis at Pontifical Catholic University of Sao Paulo (PUC-SP), where she conducted a historical-conceptual research study about the aversive control in Brazil, using theses and dissertations produced by Brazilian researchers. In this period, she also worked with children with autism spectrum disorder. Currently, she is a Ph.D. candidate in the Graduate Program in Theory and Research of Behavior (PPGTPC) at Federal University of Para (UFPA), where she is studying the concept of punishment in B. F. Skinner's work.

Bruna is a frequent contributor to Operants. *Her report on XXIV Brazilian Meeting of Psychology and Behavioral Medicine can be found in this issue.*

profile

Jim Meador, M.A.

Chief of Police
Department of Mental Health
State of Ohio

interview by Amy Smith Wiech, PHD, BCBA-D

Jim Meador is a law enforcement professional with over 17 years criminal justice experience. Additionally, he is a U.S Army combat veteran of both the Iraq and Afghanistan campaigns. His experiences include operations oversight, emergency response planning and execution, SWAT, law enforcement training, and organizational leadership. Jim possesses a Master's degree in criminal justice specializing in behavior analysis and is now pursuing a Ph.D. in performance psychology. Jim serves as Chief of Police for the State of Ohio Department of Mental Health.

Police use of force typically occurs in high stress rapidly evolving adversarial situations. Jim seeks to improve police performance under these challenging conditions with the technology of applied behavior analysis.

What evoked your motivation to go learn more about ABA from a Law Enforcement/Military background? Tell me about your previous experiences in LE/Military and how you found out about ABA.

I have been a law enforcement officer for 14 years and I am now the Chief of Police at a State Psychiatric hospital. For 15 years, I concurrently managed Army Reserve duties; I am a combat veteran of both the Iraq and Afghanistan campaigns. I became very interested in applying behavior analysis to improve police training outcomes while working as a law enforcement training officer for the Ohio Attorney General's Office and completing my graduate program in criminal justice, specializing in behavior analysis. I'm currently a doctoral student working on my Ph.D. in performance psychology.

While exploring the possibility of earning my BCBA certification I came in contact with Dr. Kent Corso who is a US Air Force veteran and the ABAI Military and Veteran SIG chair. We shared common interests; in particular, Kent has been working to expand ABA applications beyond those which we most commonly see. I had been looking for BCBA supervision and was struggling to find non-university practica or other training opportunities that are outside the field of Autism. He agreed to supervise my BCBA hours and has been extremely instrumental in the progress I have made thus far: He is a wealth of knowledge.

While working as a law enforcement-training officer, I specialized in the use of force instruction and was on a mobile training team. I travelled all over Ohio conducting one on one, or one on two training with a video simulator system. Kent and I developed a program improvement project aimed at improving the quality of instruction by applying ABA methods to my training program.

Video simulation training is the current gold standard when it comes to training police officers to respond appropriately in a deadly threat situation, but one of the problems I had experienced when training officers with the simulator is that there was often delayed engagement with the video scenarios and I was observing poor tactical performance. This was not ideal because time was limited when attempting to train an entire police department; it was important that we optimize our time together on such a

critical topic. Kent and I decided to examine the impact of instructor behavioral modeling on officer latency of engagement and tactical performance. I operationalized typical adaptive and maladaptive tactical behaviors and for the next eight months I objectively gathered data while travelling to various police departments in the State of Ohio. The results thus far have been pretty exciting because the modeling technique had a strong impact on officer responses during the training, not only in regard to response latency, but also their overall tactical performance.

While conducting the training, Kent had the idea of comparing performance of veterans and non-veterans. At this point the sample has been relatively small, but some trends are emerging which are worth investigating.

What is the difference between how the law enforcement understands their term of 'behavioral analysis' and how we see our science of ABA being applied in Law Enforcement?

Law enforcement looks at behavior analysis as basically the definition of two words in isolation: behavior-someone's actions; analysis: understanding something. However, law enforcement's goals are to prevent, decrease, or eliminate illegal behaviors, not necessarily increase the frequency of adaptive behaviors. Although there have been some interesting attempts to provide reinforcers for adaptive citizen behaviors (randomly providing gift cards etc. when observing preferred driving behaviors), it is highly unusual, and LE typically attempts to modify behavior with punishment (warning, citations). Law enforcement officers in particular tend to deliver the punishment as well as our court systems. Interestingly, the FBI has what it calls a "behavior analysis unit". The FBI BAU is an interdisciplinary team of psychologists (forensic/clinical) that primarily attempt to profile criminals. They also enlist practitioners of various disciplines like anthropology, entomology, and pathology.

What do you think <u>are the top</u> possible applications of our science of ABA to benefit Law Enforcement?

Appropriate use of force: not premature force, but also not hesitating once lethal force is needed.

Increasing fluency of all current skills related to keeping officers safe in the field.

Decreasing behaviors that are influenced by a bias. Stated in behavioral terms: preventing or re-training officer behaviors which demonstrate an unhelpful stimulus generalization, whereby the use of force and application of the law is erroneous due to the stimulus generalization

Increasing proper stimulus control, attentional control, and overall management of autonomic arousal—especially in intense, stressful, and adversarial situations.

Do you have any current ideas or opinions regarding the improvement of law enforcement training as it relates to ABA?

Yes, I do. Although it is extremely important for an officer to be a proficient marksman with his/her duty weapon, it is even more critical to be proficient while experiencing extreme arousal and respond appropriately to a perceived threat. It is typical that police academies spend 1-2 weeks training officers basic marksmanship skills, but in my experience use of force training should play a very central role in the academy curriculum. I believe that officers should receive 40+ hours of *intensive* performance and psychological skills training on the use of force, supplemented by legal instruction. This training should be driven by science and become a routine in-service training throughout an officer's career. I think that ABA and some of the new performance psychology research out there could vastly improve these curricula. The US Army has embraced performance psychology and implemented very widespread performance and resilience programs for both soldiers and their families. ABA methods could greatly enhance these programs, as well as their existing training methods. It is also time for the civilian law enforcement community to be introduced to ABA. There is a fast growing trend out there among law enforcement trainers to find answers in the research literature; the ABA community needs to take advantage of this, exposing its findings to the LE community. Dissemination of ABA outside the world of intellectual and developmental disabilities, and special education is paramount.

I have looked into the media hype surrounding the arrest related fatalities over the last 3 years. From an ABA standpoint, what can our profession and science do to support the LE community?

We need to help the law enforcement community understand that behavior is learned and that it can be retrained, shaped, and improved to the point of precision, if needed. We need to respectfully and tactfully empower the

LE community to sharpen its tools (i.e., help them allow us to improve their behaviors).

What are the low hanging fruits for us to assist with?

The LE community actually thinks a little like behavior analysts in some situations. Our logical, systematic, and practical approach will appeal to them. These are our low hanging fruits.

Are the data being reported reliable? Why/why not?

The data are reliable in many cases where officers have engaged in specific behaviors described and captured on video, however, the reality is that there are sometimes variables the video cannot or did not capture. There are also varying opinions concerning the militarization of the police. Officers wish to come home to their children at night, so they require proper tools to accomplish this. However, it is a balancing act, and this is where training is helpful; working on arousal control and SD's, which passively elicit cooperation and compliance without prematurely resorting to more aggressive methods in the community. And then there are bias issues, which we have already touched on.

I see pairing as a solution to repair the negative image some people in the US have of LE. We used to have activity leagues in every town, where police would play basketball, baseball etc with kids. How can you see that possibly happening.

This has actually been happening for years, and in many cases it has resulted in successful outcomes. Many police departments have active police athletic leagues (PAL) as you describe, citizen police academies, and ride-along programs in place. These are helpful, particularly with our youth. They provide opportunities for modeling, verbal feedback, and naturalistic learning. From a macro-perspective, police agencies are typically utilizing a community policing strategy these days in an effort to mingle with those they serve, build trust, and foster positive relationships.

What would it take to get senior decision makers in LE to be motivated to learn more about ABA?

Police culture can be a tough nut to crack. There are many departments who are progressive, but just as many that are "old school" and extremely resistant to change. Many of the command staff officers are from an older generation and even the incorporation of modern technology can be aversive, much less a science they have never heard of. Senior decision makers need to see irrefutable concrete evidence. This is where ABA's evidence based methods will be very useful.

How can behavior analysts like me who are interested in this, assist within local LE agencies?

Join the ABAI MilVet SIG; read up on Bill Lewinski and LTC Dave Grossman's work, and then analyze it in ABA frameworks. We can also collaborate on projects similar to what Kent and I have done, but together — across vicinities/precincts/localities. We need to start conversations at local levels — ask LE leaders what their problems are departmentally. Then analyze in ABA terms, and offer solutions. This may require some pro bono work at first. However, like all good consultants, you have to give them a sense of the value you add, before expecting them to fund your ideas. This leads me to my last point. The more data we can generate, publish, and disseminate, the more convinced they will be. The LE community (like ours) likes to rely on tangible things — data.

What are your short and long term future goals as related to ABA and LE?

Myself, Dr. Corso, and Dr. Abigail Calkin have become increasingly aware that applied behavior analysis has an underappreciated range of applications, and the possibilities are endless. Dr. Corso and Dr. Calkin are very strong advocates of utilizing ABA to treat combat veterans with PTSD, TBI, or to even prevent suicides that are near epidemic levels in our military. I have plans to continue conducting projects and research in an attempt to find new ways to improve officer performance when faced with an unexpected adversarial threat. I also hope to provide use of force, training-development, and performance management consultation to LE agencies. Additionally, myself, Dr. Corso, and Michael Kondis, a very close combat veteran friend of mine who is a professional software architect, have been hard at work continuing to pilot a digital celeration chart adapted to mobile platforms such as the iPhone, iPad, and Android devices. We hope to expand the utility of this grossly under-utilized tool, so that Behavior analysts, educational staff, trainers, and new users such as the LE and military communities will learn to use and appreciate a

game-changing software application. Dr. Calkin has played an invaluable role in the development and direction of this technology, which I truly appreciate. I am lucky…it's not every day that one gets to work so closely with some of the giants of our field.

Are there differences between the military and law enforcement in regard to the use of behavioral principles?

Answer: Yes. My opinion is that the military takes full advantage of behavioral principles while civilian law enforcement is failing miserably. The US Army issues every young soldier a "Warrior skill handbook". Essentially, these handbooks consist of a collection of task analyses for a variety of combat tasks. Most basic training skills are taught with behavioral chaining techniques, rule governed behavior, and the military makes every effort to train soldiers in naturalistic environments that mimic the array of stimuli soldiers will encounter in combat. The military is also very adept at utilizing punishment contingencies and intermittent reinforcement to modify behavior.

In the civilian law enforcement realm, it has been my experience that there is a lack of behavioral knowledge among most supervisors and many trainers. LE supervisors often influence their staff with coercion but rarely provide positive reinforcement. There is also a general lack of informed leadership in many law enforcement environments unlike the military where there is a very robust leadership training system in place. However, there has been a recent surge in interest when it comes to evidence based training and practices. Dr. Bill Lewinsky of the Force Science Institute is at the forefront of these efforts.

Thank you so much for your time, and I am honored to be given the opportunity to share my ideas, concerns, and experiences with the behavior analysis community particularly, for such an important organization like the B.F. Skinner Foundation. ●

About the Interviewer:

Amy Smith Wiech, PHD, BCBA-D, is a Board Certified Behavior Analyst- Doctoral with over 25 years experience working in the field of special education, developmental disabilities and autism. Dr. Wiech is the founder and Executive Director of Autism Behavior Consulting Group (ABC Group), a clinic-based ABA treatment setting near Honolulu, Hawaii.

Dr. Wiech co-founded Autism Training Solutions and Advanced Training Solutions (www.AutismTrainingSolutions & www.AdvancedTrainingSolutions.com which provides online, video based training to teach teachers, parents and other service providers evidence based interventions for supporting individuals with ASD and other related disabilities.

The use of behavior analysis including research within law enforcement has become a recent area of interest for Dr. Wiech, in light of the recent arrest related fatalities across the media. Research interests include police training and performance.

profile

Rebecca Dogen, Ph.D., BCBA-D

Hong Kong

Interview by Jeremy H. Greenberg, Ph.D., BCBA-D

Dr Rebecca K. Dogan grew up as an expatriate in Hong Kong and Singapore. She received her formal education and training in the United States and relocated back to Asia following graduate school.

Dr Dogan has a Ph.D. in Behavioral Psychology/Behavior Analysis and is a certified practitioner who conducts behavioral assessments and is qualified to design and supervise behavior analytic interventions. She is focused on providing clinical services to children and adolescents as well as their families. She stresses the importance of collaborating with a multidisciplinary team including doctors, specialists, teachers, caregivers, and extended family members.

Dr Dogan provides services that utilize evidence-based behavioral and cognitive-behavioral treatments for a wide variety of developmental and behavioral problems encountered by children and youth.

When did you first become interested in B. F. Skinner's work?

My Masters degree was in clinical psychology. While I was working toward my degree I was exposed to a lot of different psychological theories. Within each of those there were multiple models, intervention strategies, and psychoanalytic approaches which I found fascinating but very broad and overwhelming. I felt like someone had given me all the pieces to one of those thousand piece puzzles, but I didn't know where they fitted. I didn't know what strategies or what interventions would work best with which cases. So then at the very end of my masters I took my first intro to Applied Behavior Analysis course. That was my first introduction to B. F. Skinner. Once I understood his concepts about behaviorism, I loved the simplicity and clarity that came with it and the fact that it didn't just work with a particular behavior or individual but across all my cases.

What's your favorite B. F. Skinner book?

My favorite and the book that I enjoyed reading the most is *Walden II*. It was a fun read. When I had started it I had only really been exposed to a limited population consisting primarily of younger children on the autism spectrum. So when I read this book it was almost overwhelming to think that a community could be created in the future that was based entirely on the application of behavioral principles. This notion was very exciting for me. I thought about the potential it had with the future populations I wanted to serve and help. I don't think that we're going to have a *Walden II* anytime soon but I do feel that we should be modeling this idea in a range of settings such as universities, clinics, and centers.

What attracted you to the field of Applied Behavior Analysis (ABA)?

I was attracted to ABA because I could actually see behavior change. The knowledge that I helped create that change played a significant role in staying in the field. This was very powerful and highly motivating for me to see it in a step-by-step fashion. ABA is also highly appealing to me because I can teach it to parents during my sessions. For instance, I have parents join me for most cases. Primarily because I don't want them to see me as some type of wizard, as if I was behind the curtain doing some extraordinary magical things with their kids. I want them to see what I do and that is simply just science. I think when they see me applying the skills in practice, they leave empowered to go

home and work with their children. In return, that makes my job easier and it makes the gains more meaningful.

What are your current areas of interests in the field of Applied Behavior Analysis?

My current area of interest is on the cultural competence of the practice of behavior analysis. I want to know how to improve it, and how to make better tools to help promote it. There is a trend toward increasing adoption of behavior analysis internationally. I know that when I've worked with diverse populations in Los Angeles, the Native American community, both local and expatriate families throughout Asia, the importance of culturally sensitivity is invaluable. For instance, for some of the non-American families I really have to decrease the frequency and intensity of praise. For other families, I spend more time talking about punishment and explaining the negative consequences associated with it. I've even recently had a Western European family request additional time to discuss the importance of their child's diet. The child had a limited yet still a number of foods that he liked. I did not consider this a primary issue however, eating was such an important part of their culture that the family considered it an area to address. The family and I avoided conflict because I was open to that idea, understood it, and had taken the time to learn more about their culture. I think that behavior analysts really need to focus on cultural competence to maintain balance between what our families need and value while adhering to the ethical standards of the behavior analytic community.

What do you view as the present hurdles to widespread adoption of Applied Behavior Analysis in Hong Kong?

Hong Kong has experienced tremendous growth recently. We now have 36 Board Certified Behavior Analysts and multiple service providers, which is fantastic. The hurdles that exist for widespread adoption are no different across the globe. It is just that we are at different stages compared other places like the US or UK. I remember when I was getting my masters and I was working in California. I think we were the only state at the time that provided government-funded services. Right now, 10 years later, I feel that again we're all at different stages of awareness and acceptance of ABA. Hong Kong's just a little further behind some countries but it's far more advanced than others. I think that the hurdles come down to a couple different levels one of which is public policy. We need our government to acknowledge and provide funding for evidence-based treatments, such as ABA services.

Second, the community's perception of ABA needs to be accurate which is accomplished through education, awareness, and exposure. I have found in many other countries where I have worked, the perception is that ABA is synonymous with Discrete Trial Training (DTT) or punishment. Getting the community to understand ABA and how it has been effective across a wide range of adults and children is of the utmost importance.

At the organizational level we need for Hong Kong to increase its volume of schools that provide learning support teams. We also need to provide more services for children with disabilities. The local education systems require training to administration and teachers. The community could benefit from more awareness of autism and ABA. The doctors who see the children and their families would also benefit from further exposure to ABA and how it can help their patients. Last, at the interpersonal and individual levels, for our relationships with other professionals we need more collaboration rather than parallel partnerships. We need to continue to adjust our behavior speak before we will be fully acceptance into the community of professionals in mental health or behavioral health. We need to take a step back, be humble, and listen to other professionals' explainations that might be the same, just with different terminology while the goal is the same. We need to apply our skills in all aspects of our lives, not just with our indivdiual patients. ●

profile

Hyo-shin Lee, Ph. D.

President of Korean Association for Behavior Analysis,
Professor of Special Education for Early childhood,
Daegu University, South Korea.

Interview by Yunhee Shin. Ph.D.

In Korea, behaviorism was offcially recognized in 1980, and applied to psychological and educational fields. Many Korean people know enough about Skinner to identify 'rat box' or 'operant conditioning' as related to behaviorism.

However, I hope that books written by Skinner will one day be translated by Koreans. Translation is important because we can't meet Dr. Skinner any more. We can only understand his thoughts through his books.

Recently, Korean education has had many challenges to manage students' behavior problems, especially including students with emotional and behavioral disorders and the at-risk students. Most teachers in public schools are learning how to manage them, but they have lots of work everyday, and the curriculum is quite strict.

Professor Lee is interested in behavior analysis for special education. She has published many articles and books related to behavior analysis and teaching strategies on the behavioral approach for students with emotional and behavioral disorders. I met with Professor Lee to discuss her work.

Please introduce yourself, and tell* Operants *readers about your interest and your project.

I studied education on emotional and behavioral disorders for my undergraduate degree. I continued my studies and earned my Ph.D degree in special education from Daegu University, South Korea.

Daegu University was the first educational organization that 60 years ago provided courses in special education in my country. There are more graduate and undergraduate students and faculty in Daegu University as ever, now setting up many programs for special education in several universities in South Korea.

한국에서 행동주의는 1980년에 논문에서 소개되어 심리학 및 교육학 분야에 적용되어져 왔습니다. 많은 한국 사람들은 행동주의를 떠올리면 쥐실험이나 조작적 조건화라고 말할 정도로 Skinner를 압니다. 그러나 저는 스키너의 저서들이 한국에서 더 많이 번역되었으면 하는 바램이 있습니다. 물론, 한국에서 심리학이나 교육학 개론서에 한 부분이 행동주의를 소개하고 있지만 말이지요. 왜냐면, 더이상 우리가 Skinner를 만날 수가 없다면 저는 그의 생각을 그의 저서를 통해서만 이해할 수 있다고 생각하기 때문입니다.

최근에, 한국에서는 정서행동장애 및 위기 학생들 을 포함하여 행동에 문제가 있는 학생들을 지원하는데 어려움을 겪고 있습니다. 많은 학교 선생님들은 학생들을 어떻게 대해야 하는지 알길 원하지만 매일의 다량업무와 교육의 커리큘럼 상 그렇게 하지 못하고 있습니다.

이효신 교수는 특수교육분야에서 행동분석에 관심이 많으신 분입니다. 특히 행동적 접근에서 정서행동장애 학생들을 위한 행동분석과 교수전략에 관련하여 많은 논문과 저서를 내셨습니다. 이런 이유로, 저는 이효신 교수님을 만나뵈어 몇가지 질문을 드렸습니다.

소개와 함께 교수님의 현재 관심과 현재 진행하고 있는 프로젝트에 대해 말씀해주시면 좋겠습니다.

전 정서행동장애교육을 공부하고 한국의 대구대학교 특수교육학과에서 박사학위를 받았습니다. 대구대학교는 한국에서 가장 처음 특수교육을 시작한 대학으로 올해로 60년의 전통을 가지고 있습니다. 지금은 특수교육과가 있는 대학교가 여러군데 생겼지만, 여전히 학부와 대학원의 학생이나 교수진 규모는 우리나라에서 가장 큽니다.

제 지도교수님은 강위영 교수님이신데요. 우리나라에 정서행동장애에 대한 공적인 관심을 이끌어내시고 우리나라에 처음으로 정서행동장애 특수학교가 설립되는 데 공헌하신 분입니

My advisor, Dr. Wi-young Kang, is the person who attracted the public's attention to students with emotional and behavior disorders. He established a special school for such students, and received a national accreditation. This was in the early 1980s. He also founded and fostered the Korean Society for Emotional and Behavioral Disorders (EBD) in 1985. It became the backbone of Korean ABA, and it is coming up on its 30th anniversary this year.

I've worked here, in Daegu University, for many years and have been involved in Korean society of EBD. This is my story of how I started my career in behavior analysis.

As far as my research is concerned, the project for autism and ADHD screening through robot-based behavior analysis is currently underway. What makes this project most interesting is the necessity of collaboration between various specialists in many fields, like engineers, educators, and programmers.

Your books and academic activities are related to applied behavior analysis for special education and for child's behavior support. What do you think of Skinner's influence on special education in Korea?

Special education, as well as general education, and, generally speaking, all human activities are affected by Skinner's science. However, his theory has particularly more clout in special education. Because Skinner tells us the way to see human's behavior in analytic and systemic view, and this way is essential in the special education field.

What made you interested in applied behavior analysis to begin with?

Personally, I got interested in behavior science as I was raising up my son and daughter, and I ran into an understanding that this process is not going to be an overnight thing. In South Korea, many people are trying to educate themselves before they become parents. In my case, in the upbringing of my children, I was using behavior analysis on an everyday level.

There are many theories of human behavior, but I think that behaviorism has a charm of both obviousness and objectivity.

What do you feel when you teach future teachers both behavior analysis and behavior support in special education at your university?

Some people who studied behaviorism said the theory is relatively easy and simple. All the while they didn't

다. 또한 한국정서행동장애교육학회를 창립하고 발전하신 분이기도 합니다. 이 모든 일이 1980년대 초의 사건들이죠. 한국ABA의 근간이기도 한 한국정서행동장애 교육학회는 1985년에 창립되어 올해로 30주년을 맞았답니다. 저는 대구대학교에서 오랫동안 일해왔고 한국정서행동장애학회에 참여하고 있습니다. 제가 이런 것을 말씀드린 이유는 이것이 저의 이야기기도 하기 때문입니다.

제가 지금 하는 연구는 로봇기반 행동분석을 이용하여 자폐와 ADHD를 일반아이들로 부터 선별하는 작업입니다 다양한 분야의 전문가들, 엔지니어링, 교육, 프로그래머들과 협업하는 것이 필요한 일입니다. 매우 흥미로운 일이지요.

교수님께서는 특수교육현장에 응용행동분석 및 행동지원 분야와 관련되어 저서와 학술적 활동을 하고 계시는데요, 한국 특수교육분야에 있어 스키너의 영향력을 어떻게 생각하시는지요?

일반교육 뿐 아니라 특수교육, 더나아가서 인간의 모든 활동분야에서 우리는 스키너의 영향을 받습니다. 그러나 특수교육분야에서 Skinner의 영향력은 더 크고 특별하다고 할 수 있겠습니다. 왜냐하면, Skinner는 인간의 행동을 더욱 분석적이고 체계적이면서 객관적으로 보는 방법을 우리에게 알려주었고 이 방법은 여전히 특수교육 현장에 더욱 필요한 부분이기 때문입니다.

이와 관련한 질문으로, 교수님께서는 어떻게 응용행동분석에 관심을 가지시게 되셨나요?

개인적인 부분인데요. "행동"에 관심을 가지게 된 것은 아들과 딸을 키워야 하는 현실에 부딪혔기 때문입니다. 한국에서는 많은 사람들이 부모가 되기 전에 여러가지 준비를 하고 부모가 되지만, 제 경우, 아이를 양육하는 것은 다른 차원의 중압감이었고, 더 나아가 이것은 단숨에 잘하게 되는 일도 아니지요.

그래서 인간행동을 설명하는 여러가지 이론이 있지만 행동주의는 명백함과 객관성 이 두가지가 매력이라고 저는 생각해요.

학교현장에서 행동분석과 행동지원을 할 예비교사들을 학교에서 가르치시면서 어떤 생각을 하시는지 궁금합니다.

행동주의를 공부한 일부 사람들은 이 이론이 비교적 쉽고

take action. As the result, they don't understand Skinner's philosophy, rather they focus only on application through their knowledge. Therefore, I think it is important to read Skinner's books in order to understand Skinner's philosophy when we teach future educators. This also emphasizes the importance of having translated copies of Skinner's books into Korean and other languages.

Tell us about the chapter of Korean ABA in the association of applied behavioral analysis.

Korean ABA Chapter was approved by ABAI in 2003. I think, this was the direct result of Dr. Sangbok Lee's steady efforts. Unfortunately, she passed away 3 years ago. Dr. Lee was an ex-president of Korean Society for EBD. Korean ABA and Korean Society for EBD have held fast and strong under her leadership. The relationship between two organizations is still well-maintained.

Walden Two in Korean

Korean ABA has annual summer and winter professional training for teachers and therapists focused on behavioral support. People attending the training should become members through the internet, to inform ABAI who is involved in Korean ABA. And I can tell you that this number is growing

Do you have any difficulties combining your duties at the University with those of the president of the Korean ABA Chapter?

I have confidence in Korean teachers who understand and make good use of the principles of ABA in the education field. I also believe that this collaboration between teachers, therapists and parents will contribute to the development of education, even though my faith has been shaken due to differences between political establishment and those representing education.

What are the issues that behavior analysis in education is facing recently? Which part of behavior analysis for teaching should be researched?

In South Korea, parents who have a child with a disability advocate for equal treatment. Unlike ten years ago, when school staff thought that students with 'behav-

단순하다고 말합니다. 그러면서도 현실 적용을 못하는 경우가 있습니다. 저는 그것이 행동주의의 철학을 이해하는 것이 아닌 전략이나 기법을 단순히 익히고 적용하는데 있다고 봅니다. 따라서 저는 학생들이 행동주의를 배울때, Skinner의 철학을 이해하기위해 Skinner의 책들을 읽는것은 중요한 한 부분이라고 생각합니다.

세계행동분석학회(ABAI)의 한국 ABA지부에 대해 말씀해주세요.

한국 ABA지부는 2003년에 ABAI로 부터 공식적인 승인을 받았습니다. 제 생각에 이 모든 것은 3년전 돌아가신 고 이상복 교수님의 노력의 산물이라고 생각합니다. 그녀는 전 한국정서행동장애교육학회 회장이었고, 한국 ABA지부와 한국정서행동장애교육학회는 이상복 교수님이 계셨을때 깊은 협력관계를 만들어왔습니다. 지금까지도 그 관계는 계속 유지되고 있습니다. 한국 ABA지부는 연간 2회에 걸쳐 여름 겨울 행동문제관련 연수를 교사와 치료사들에게 운영하고 있습니다 연수에 참석하는 사람들은 의무적으로 ABAI의 정보와 한국ABA지부에 참여하도록 웹상에서 회원가입을 해야합니다. 아마도 이런 절차로 한국의 ABA 지부가 많은 회원수를 가지는게 아닌가 합니다.

한국ABA지부의 회장으로 계시면서 어려움은 없으셨나요?

저는 ABA의 원리를 교사들이 바르게 이해하고 현장에서 바르게 적용할 수 있어야 한다는 신념을 가지고 있습니다. 또한 제도적 혹은 정치적 이유로 그 믿음이 흔들릴때 어려움을 느끼지만 그럼에도 불구하, 교사, 치료사, 부모간의 협력이 이 분야의 발전에 공헌할 것이라는 믿음이 있습니다.

최근 교육에서의 행동분석에 대한 이슈는 무엇인가요? 행동분석에서 어떤 부분이 더 연구되어져야 된다고 보십니까?

한국에서는 장애아동의 학무모 그리고 행정전문가들간에 아동이 가진 '행동문제'는 특별히 지원되어야 한다는 개념을 갖게 된 것이 약 10년전과 달라진 점입니다. 이러한 현상은 제도에서도 들어나고 있는데요. 행동지원에 대해서 사회적 인식이

ior problems' should receive special treatment. This situation is emerging as a policy, because parents have changed the perspective on behavior intervention, and called on the government to support them. It's time to foster young specialists.

In Korea, all 1st and 4th grade students in elementary school have to take a screening test for emotional and behavior support. However, this practice is controversial. The screening test is not helpful, because parents believe that teachers will prejudge their children, if they are honest about the emotional and behavioral needs. Rather, they hide their child's behavior problem to ensure fair treatment. What do you think of Korea's behavior support system for students?

We should have a flexible approach for screening students with emotional and behavior problems. Also, we should approach pupils with problems at a range of various angles. Teachers report to parents only on academic aspects, and their comments may be confusing and vague. Therefore, the support system for EBD should consider the integration of student's social environment, behavioral context, and local specifics.

There are many approaches to support the life of people with disabilities. Some become trendy. Recently, many therapies using various mediums are overflowing South Korea.

I think every theory and approach has value, and should be respected. However, it seems like a dangerous endeavor to do something for the pursuit of personal desire and political dynamics. With this in mind, we should strengthen ethics. I hope that the lives of students with developmental and behavior problems around the world will be improved through applied behavior analysis. This is my special request to parents and teachers. ●

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reflections

A New Technology Based on Variation and Selection

変異と選択に基づいた新しい技術

by Naoki Yamagishi, Ph.D.
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Naoki Yamagishi is an associate professor at Ryutsu Keizai University in Japan. He earned his MA and his Ph.D. in psychology from Komazawa University, and has been a member of the board of editors of the Journal of Japanese Behavior Analysis since 2006. His main interest is experimental analysis of human behavior, especially variability of human behavior and its functions.

山岸直基氏は、日本の流通経済大学の准教授です。彼は駒澤大学で心理学の修士と博士を取得しました。そして、2006年から現在まで行動分析学研究の編集委員を務めています。彼が主に関心をもっている領域は、実験的人間行動分析学で、特に人間行動の変動性とその機能です。

When we listen to someone's admirable discourse, we may be impressed and motivated to learn how to present material in a similar manner. When we watch someone's great performance on a college basketball game, again we leave the game with great motivation to acquire the same skills. But sometimes these repertoires are difficult to build.

How could they have acquired such brilliant skills? I cannot imagine it. As a child it was a challenge to learn how to ride a bike effortlessly, and my lectures in a psychology class sometimes occasioned students to take a nap. Fortunately, researchers in behavior analysis are developing a new technology of acquiring skills, not only for pigeons and rats, but also humans. It could contribute to the development of some instructional programs to enhance skill acquisition.

Development of this technology goes back to a shaping procedure of pigeons pecking keys. The procedure includes the processes of variation and selection of behavior. Variation of behavior is generated by an extinction procedure. Selection is conducted by a differential reinforcement procedure. The combination of variation and

私たちは、すばらしい講演を聴くと、感動するとともに、そんなふうに話せるようになりたいと思います。また、大学対抗のバスケットボールの試合で、洗練されたパフォーマンスを見ると、興奮しその選手と同じようなプレイができるようになりたいと思います。しかし、それらを学習するのはしばしば困難です。

彼らはどのようにしてそのような技術を学んだのでしょうか。私には想像することもできません。私は、幼少期に自転車に乗る練習をしたときにはたくさんの練習が必要でしたし、今も心理学の授業では、私の話が生徒の眠りを誘うこともあります。幸運なことに、行動分析学の研究者はハトやラットだけでなく人間がスキルを獲得するための新しい技術を開発しています。これは、スキル獲得の指導プログラムの発展に貢献するかもしれません。

この技術の発展は、ハトのキーつつきのシェイピング手続

selection shapes behavior. It is to be noted that the extinction procedure had some difficulty in controlling the level of variation and sustaining the variable behavior.

Page and Neuringer published remarkable research on behavioral variability. They invented a new differential reinforcement procedure that increased the variability of pigeons' key pecks by reinforcing the less frequent pecking pattern. The pigeons had the opportunity to peck at two keys to make an eight-response sequence pattern. This procedure reinforced the less frequent eight-response sequence patterns resulting in increased variability. The differential reinforcement procedure had some advantage of controlling behavioral variability over the extinction procedure. The procedure manipulated the level of behavioral variability more precisely and generated the variable behavior. As a result, the variable behavior maintained over time. This procedure is called the lag schedule.

Following the findings, Neuringer and his colleague tried to use the lag schedule for shaping a sequential response. A sequential response is difficult to learn by continuous reinforcement alone. At first, when rats are exposed to the lag schedules, they generate several inconsistent sequential responses. The next step was to thin reinforcement rate by adding intermittent reinforcement to the lag schedule. The rats still maintained variable responses during this step. After that, continuous reinforcement of a target sequential response was introduced. Rats gradually acquired the target response. Neuringer and his colleague, contrived a new technology for behavior acquisition that included several differential reinforcement procedures that work not only for selection but also for variation of responses.

Behaviorists applied this technology to learning skills such as some job interview skills for adults with an intellectual disability and to shaping the athletic skills of martial arts for adults.

Furthermore, behavioral variability is also related to human schedule performance. Generally, humans respond fast on interval schedules. However, I have data that show that the rate of college students' responses decreased on interval schedules, after the variability of inter-response time was increased by the lag schedule. Increased behavioral variability changed human schedule performance, indicating that humans are sensitive to reinforcement schedules. Neuringer's and my work demonstrates that increased response variability enhances adaptation to new environments.

On the other hand, several articles reported that these

きにまで遡ることができます。この手続きは行動の変異と選択（variation and selection）の過程を含んでいます。行動の変異は消去手続きによって生まれ、行動の選択は分化強化手続きによって行われます。変異と選択の組み合わせによってシェイピングを行います。しかし、消去手続きには行動の変異の程度をうまく制御できず、また変動的な行動を持続するのが難しいという問題があります。

Page & Neuringer □1985□は、行動変動性についての注目すべき論文を発表しました。彼らは生起頻度の低い反応パターンを強化することでハトのキーつつきの変動性を増加させました。ハトは、２つのキーに対して８回の反応によって系列パターンを作ることができ、頻度の低い８反応系列パターンが強化され、その結果行動変動性が増加したのです。この手続きは、消去手続きよりも行動変動性をうまく扱うことができます。この手続きは、行動変動性のレベルをより正確に変化させ、そして持続的に生起させます。そしてこの手続きはしばしばラグスケジュールと呼ばれます。

この発見の後、Neuringerらは、ラグスケジュールを使って、連続強化だけでは獲得することが困難な系列反応をシェイピングしようとしました（Grunow & Neuringer, 2002□□まず、ラットはラグスケジュールの下で変動的な系列反応を生起するようになります。次に、ラグスケジュールに間隔スケジュールを付加して、ラグスケジュールの強化率を希薄化させます。そこでもラットは変動的な系列反応を生起させ続けます。その後、標的とする系列反応に対する連続強化を導入します。そうすると、ラットは標的行動を徐々に学習します。Neuringerらは、行動の選択だけでなく変異にも分化強化手続きを適用するような、新しい技術を開発したということです。

このような技術は、知的発達障がいの成人に対する就職面接技術や□O'Neill & Rehfeldt, 2014□□成人を対象にした拳法などのスポーツの技術の獲得に応用され始めています（Harding, Wacker, Berg, Rick, & Lee, 2004□□

さらに、行動変動性は人間のスケジュールパフォーマンスにも関連しています。一般的に間隔スケジュールの下でも、人間の反応率は高くなります。しかしラグスケジュールの下で反応間間隔が増加した後には、間隔スケジュールの下での大学生の反応率が減少するという実験を私は行いました。行動変動性の増加により

procedures didn't work with human participants. Though we need to review these data in detail, one of the reasons might be the lack of a thinning procedure of the reinforcement rate of the lag schedule. The shift to a new contingency becomes easier with a thinning procedure. The importance of the thinning procedure must be highlighted during a shift to the new contingency when utilizing the lag schedule.

Not only behavioral variability but also rule-governed behavior is related to sensitivity to reinforcement schedules. It is said that schedule sensitivity decreases when we have a history of rule following. Therefore, we would say rule-governed behavior is less sensitive to the current contingency. In some dimension, this is correct. But that sentence may still be misleading. Joyce and Chase explored that sensitivity to reinforcement schedules when the individual had a history of rule following. Yet Joyce and Chase found that the sensitivity to reinforcement schedules increased by some with a history of rule following. When participants were instructed "to behave more variably", they decreased their response rate in interval schedules. Some rules may reduce behavioral variability, and in turn, the reduced behavioral variability decreased sensitivity to reinforcement schedules. Other rules may increase behavioral variability and result in increased sensitivity. These findings with my speculations suggest that sensitivity is connected to behavioral variability not rule following.

This new technology is based on selection theory. It describes behavioral change as variation and selection of behavior. The scope of the account is not only the behavior of rats or pigeons but also of human beings. As described above, there is some evidence that indicates that variation and selection are core processes of behavioral change in which rule following is included. Now, we can try to use the technology in various applied settings. When will we have access to easy and behavioristic instruction programs for learning speech or for performing like college basketball players that will shake everybody's heart? I hope it might not be so far away. ●

人間のスケジュールパフォーマンスの感受性が高くなったのです。Neuringerらと私の研究は行動変動性の増加が新しい環境に適応しやすくなることを示しています。

その一方でいくつかの論文では、人間を対象にした場合に効果がなかったとされています。この問題については詳細に検討する必要がありますが、１つの理由は、それらの研究において、ラグスケジュールの強化率の希薄化を行ってなかったからかもしれません□ラグスケジュールの強化率を希薄化することで、新しい随伴性に移行しやすくなります。ラグスケジュールを使用するときには、新しい随伴性に移行するときに希薄化手続きの重要性に注目する必要があります。

行動変動性だけでなくルール支配行動も強化スケジュールの感受性に関わっています。ルールに従う経験があると、強化スケジュールに対する感受性が減少するといわれています。そのため私たちは、ルール支配行動は現在の随伴性に対して感受性が小さいと考えます。これはある側面においては正しいですが、この文章は誤った方向へ導いてしまうかもしれません。なぜならJoyce and Chase□1990）はある種のルールによって強化スケジュールに対する感受性が増加することを報告しているからです。参加者が「より変動的に」と教示されると□間隔スケジュールにおいける反応が減少するようになります。あるルールは行動変動性を減少させ、その結果感□受性が減少しますが、また別のルールは行動変動性を増加させ、その結果□感受性が増加します。したがって、感受性はルール追従よりも、行動変動性と関連していることが示唆されます。

この新しい技術は、行動の選択理論□selection theory□に基づいています。この理論は行動変化を行動の変異と選択として記述します。この説明はラットやハトの行動だけでなく人間の行動も範疇に入れています。そしてすでに述べたように、ルール支配行動を含めた行動の変化において変異と選択が核になっていることが示されています。これから私たちはさまざまな応用場面でこの技術を利用することができます。いつ私たちは□スピーチや大学バスケットボール選手のようにプレイで感動を与えられるようになる、容易で行動的な指導プログラムを使えるようになるでしょうか。もうすぐ使えるようになることを私は望んでいます。●

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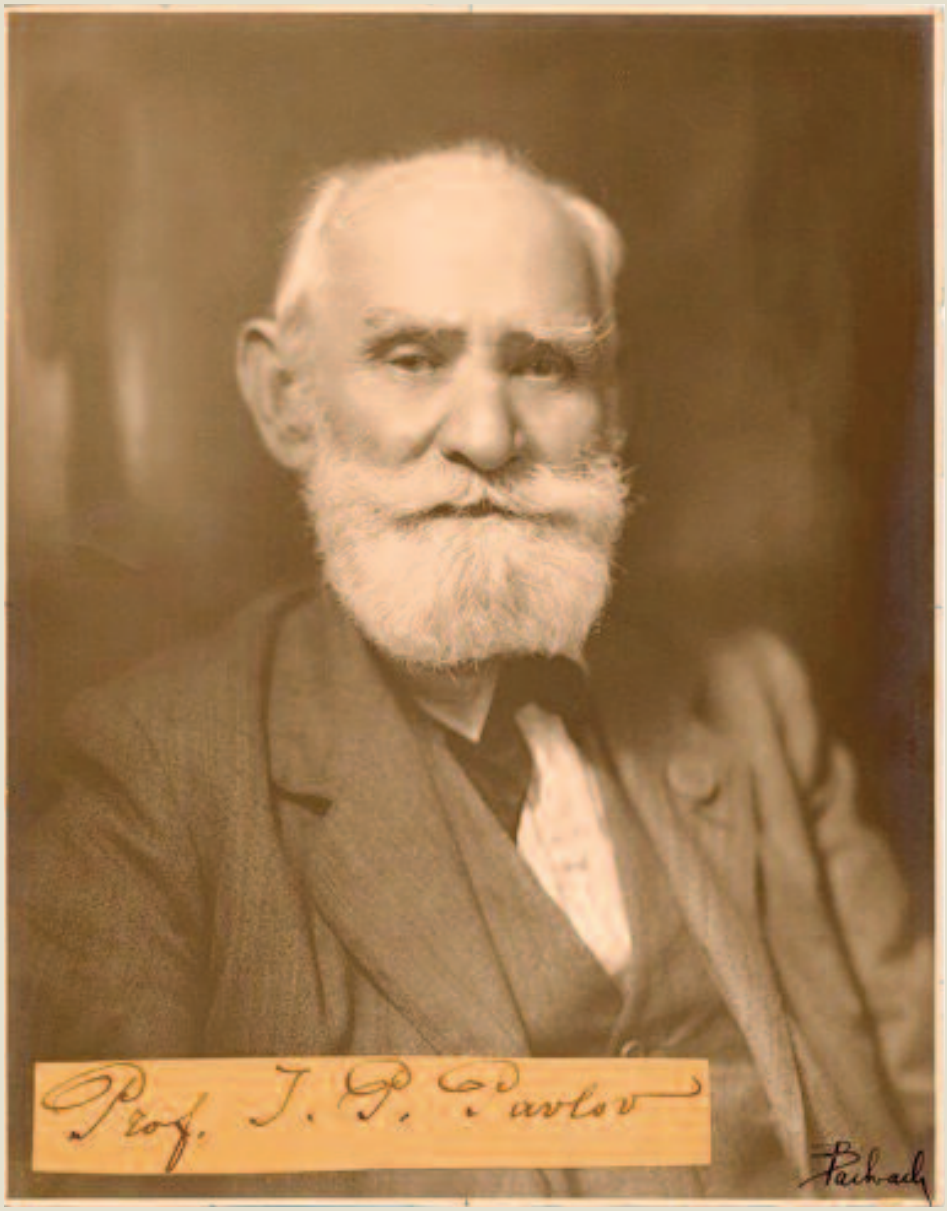

"The International Congress of Physiology met at the Harvard Medical School in August 1929, and Ivan Petrovich Pavlov gave the principal address! I had met Hallowell Davis, in the Department of Physiology at the Medical School, and he arranged for me to serve as a volunteer at the congress. (...) I heard Pavlov's presidential address (in German) but did not try to shake his hand. I did get his autograph. A photographer was taking orders for a portrait and had asked Pavlov to write his name on a slip of paper so that his signature could appear on each print. I offered to buy a copy if I could have the slip of paper when the photographer was through with it, and he sent it to me." B. F. Skinner, The Shaping of a Behaviorist.

Skinner kept this portrait with a signature pasted on top of it on the wall of his office throughout his career.

B. F. Skinner Foundation

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