Operants

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In the 1930's, young **B. F. Skinner** built his first apparatus to study behavior using rats as subjects. Today, scientists are designing **experiments** where rats are making "selfies" and playing basketball, giraffes are sticking their blue tongues out, and primates are learning to cooperate — all to **advance** the science of behavior that Skinner started.

from the president

People sometimes ask "Why doesn't everyone talk with newscasters' grammar and pronunciation?" We certainly often hear their talk. The answer, not surprisingly, is given in B. F. Skinner's 1957 book *Verbal Behavior*. Skinner makes it clear that children do not learn to talk by listening. They must make sounds from which specific forms are selected. The selected forms also include grammatical structures.

For many years, certain linguists insisted that grammatical rules were innate. They argued that these rules determine how we speak. But recent published studies by scholars of language have shown these theories wrong. Linguists now propose a "usage-based approach to language acquisition." Like Skinner, they argue that talking comes first. Rules describe the structures talkers use. Children acquire grammatical forms through talking with others. Skinner would not, however, explain a child's language development as due to inferred "learning mechanisms in a developing brain." Rather Skinner would talk of caregivers shaping both pronunciation and grammar. The verbal community reinforces forms that may, or may not, sound the way newscasters talk.

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Chinese Simplified Translated by Coco Yang Liu

人们有时候会问：“为什么大家不按照新闻播音员的语法和发音那样讲话？”我们当然经常听到这样的言论，而毫不奇怪，我们能在B. F. Skinner发表于1957的《语言行为》一书中找到答案。Skinner清楚地说明了孩子不通过听来学习说话，他们发出的声音是经过选择的特定的形式，其中包括了语法结构。

很多年来，一些语言学家坚持认为语法规则是语言内在固有的，他们认为这些规则决定了我们如何讲话。但最近发布的语言学研究证实了这些理论是错误的。语言学家们提出了“基于使用的语言学习方法”。与Skinner一样，他们认为讲话本身先于语法，语法是讲话者使用的结构，孩子们通过交谈学习语法。然而，Skinner不会用“发育中大脑的学习机制”来解释一个小孩的语言发展。更准确的说，Skinner会认为是小孩身边的人塑造了发音和语法两样，一个大的语言环境加强了小孩说话的方式，也许会像播音员的说话方式，也许不会。

Chinese Traditional Translated by Kiwiya Zhang, Hui-Ting Wang, Po-Ying Tseng

人們有時會問「為什麼不是每個人都使用新聞記者的語法和發音對談？」我們當然經常聽到她們說話，但毫無疑問的，在B. F. Skinner 的1957年的著作語言行為，給出了答案。Skinner很明確的表明，兒童並非經由聽理解學習如何說話，他們必須依照所選擇的特定形式發音，這些被選擇的形式也涵蓋語法結構。

多年來，某些語言學家堅持認為，語法規則是與生俱來的。他們認為是由這些規則來決定我們是如何說話的。但是，近期由語言學者所發表的研究顯示，這些理論是錯誤的。語言學家提出「語言習得是基於語言的使用」。和Skinner立場一樣，他們認為說話是第一優先的，規則描述說話者所使用結構，兒童藉由與他人交談習得語法。然而，Skinner並不認為，兒童的語言發展是因為存在「發展中大腦的學習機制」，Skinner的說法是，兒童的照顧者同時塑造發音和語法，語言社區所增強的形式，有可能、或不一定聽起來像新聞記者的說話方式。

Filipino Translated by Michael Abarca

Minsan ang mga tao ay nagtatanong “Bakit hindi magsalita lahat ng mga tao sa gramatika at pagbigkas katulad ng isang newscaster?” Tiyak na nakarinig na tayo ng kanilang pag-uusap. Hindi kagulat-gulat na ang kasagutan ay matatagpuan sa libro ni B.F. Skinner na Verbal Behavior. Nilinaw ni Skinner na ang mga bata ay hindi natututong magsalita sa pamamagitan ng pakikinig. Dapat silang lumikha ng mga tunog na kung saan napipili ang mga ispisipik na porma. Ang mga napiling pormang ito ay kinabibilangan din ng mga istrukturang panggramatika.

Sa madaming taon iginiit ng ilang mga dalubwika na ang patakarang panggramatika ay likas sa atin. Kinakatwiran nilang ang mga patakarang ito ay ang siyang nagdedetermina kung paano tayo magsalita. Ngunit ipinakita ng mga iskolar ng lengguwahe sa kanilang mga bagong naambag na pag-aaral na ang mga teoryang ito ay mali. Nagpanukala ang mga dalubwika ng “usage-based approach sa pagtuto ng lengguwahe.” Katulad ni Skinner, iginiit nilang ang pananalita ay nauuna. Ang mga patakaran ay naglalarawan ng estrukturang gamit ng isang marunong magsalita. Ang mga bata ay natututo ng pormang panggramatika sa pamamagitan ng pakikipag-usap sa iba. Gayunpaman, hindi ipaliliwanag ni Skinner ang pagbuo ng lengguwahe bilang “learning mechanism ng isang sumisibol na utak.” Sa halip, ang paghubog ng pagbigkas at gramatika ng mga tagapangalaga ng mga bata ang binibigyang pansin ni Skinner. Ginagantimpalaan ng verbal community ang mga pormang mayroong, o maaaring wala, tunog na hawig sa mga newscasters.

French Translated by MarieCeline Clemenceau

Les gens demandent parfois: «Pourquoi tout le monde ne parle-t-il pas avec la grammaire et la prononciation des journalistes?» Nous les entendons si souvent parler. La réponse est donnée, sans surprise, dans le livre de B. F. Skinner, Verbal Behavior. Skinner explique clairement que les enfants n’apprennent pas à parler en écoutant. Ils doivent faire des sons à partir desquels des formes spécifiques sont sélectionnées. Les formes sélectionnées comprennent également des structures grammaticales.

Pendant de nombreuses années, certains linguistes ont avancé le fait que les règles grammaticales étaient innées. Ils ont soutenu que ces règles déterminaient la façon dont nous parlons. Mais les récentes études publiées par des spécialistes du language ont montré que ces théories étaient fausses. Les linguistes ont proposé une «approche basée sur l’usage de l’acquisition du langage». Comme Skinner, ils soutiennent que parler apparaît en premier lieu. Des règles décrivent les structures utilisées. Les enfants acquièrent des formes grammaticales en parlant avec les autres. Skinner n’expliquait cependant pas le développement du langage chez l’enfant comme étant dû à des «mécanismes d’apprentissage résultant d’un cerveau en développement.” Skinner parlait plutôt des aidants qui façonnent à la fois la prononciation et la grammaire. La communauté verbale renforce alors des formes qui peuvent, ou non, ressembler à la façon dont les présentateurs parlent.

Greek Translated by Katerina Dounavi

Ρωτάει καμιά φορά ο κόσμος “Γιατί δε μιλάνε όλοι με γραμματική και προφορά παρουσιαστή ειδήσεων;” Σίγουρα ακούμε συχνά την ομιλία τους. Η απάντηση, γεγονός που δεν αποτελεί έκπληξη, δίνεται στο βιβλίο του B. F. Skinner Λεκτική Συμπεριφορά του 1957. Ο Skinner καθιστά σαφές ότι τα παιδιά δε μαθαίνουν να μιλάνε ακούγοντας. Πρέπει να κάνουν ήχους από τους οποίους επιλέγονται συγκεκριμένες μορφές. Οι επιλεγμένες μορφές περιλαμβάνουν και γραμματικές δομές.

Για πολλά χρόνια, μερικοί γλωσσολόγοι επέμεναν ότι οι γραμματικοί κανόνες είναι έμφυτοι. Υποστήριξαν ότι αυτοί οι κανόνες καθορίζουν το πώς μιλάμε. Αλλά πρόσφατες δημοσιευμένες μελέτες από λόγιους που μελετούν τη γλώσσα έχουν διαψεύσει αυτές τις θεωρίες. Όπως ο Skinner, και αυτοί υποστηρίζουν ότι η ομιλία προηγείται. Οι κανόνες περιγράφουν τις δομές που χρησιμοποιούν οι ομιλητές. Τα παιδιά αποκτούν γραμματικές μορφές μιλώντας με άλλους. Ο Skinner, ωστόσο, δε θα εξηγούσε τη γλωσσική ανάπτυξη ενός παιδιού ως αποτέλεσμα υποθετικών “μηχανισμών μάθησης σε έναν αναπτυσσόμενο εγκέφαλο”. Αντιθέτως, ο Skinner θα έλεγε ότι οι γονείς διαμορφώνουν τόσο την προφορά όσο και τη γραμματική. Η λεκτική κοινότητα ενισχύει μορφές που μπορεί να ακούγονται ή μπορεί να μην ακούγονται όπως η ομιλία των παρουσιαστών ειδήσεων.

Icelandic Translated by Kristjan Gudmundsson

Fólk spyr stundum “Hvers vegna tala ekki allir með málfræði og framburði fréttamanna?” Það ætti ekki að koma á óvart að svarið má finna í bók B. F. Skinners frá 1957 Verbal Behavior. Skinner gerir það ljóst að börn læra ekki að tala með því að hlusta. Þau verða að gefa frá sér hljóð, en af þeim veljast ákveðin form. Þessi ákveðnu form fela meðal annars í sér málfræðilega formgerð.

Í mörg ár héldu ákveðnir málfræðingar því fram að reglur málfræðinnar væru áskapaðar. Þeir færðu þau rök að þessar reglur ákvarði hvernig við tölum. En nýlega birtar rannsóknir málvísindamanna hafa sýnt að þær kenningar eru rangar. Málfræðingar leggja nú til “nálgun máltöku sem byggir á málnotkun.” Eins og Skinner, þá telja þeir að fyrst komi tal. Reglur lýsa þeirri formgerð málnotenda. Börn læra málfræðileg form með því að tala við aðra. Skinner myndi samt ekki útskýra málþróun barns með því að vísa til “námskerfis í heila sem er í þróun.” Hann myndi frekar benda á að uppalendur móti bæði framburð og málfræði. Málsamfélagið styrkir formgerðir, sem gætu bæði hljómað líkt og ólíkt því hvernig fréttamenn tala.

Italian Translated by Anna Luzi

A volte ci si potrebbe chiedere: “Perché non parliamo tutti utilizzando la grammatica e la pronuncia dei giornalisti televisivi?”. Certamente li si sente parlare molto spesso. La risposta a questa domanda, non ci si sorprenda, è già stata data nel libro di B.F. Skinner Verbal Behavior del 1957. Skinner mette in chiaro il fatto che i bambini non imparano a parlare ascoltando. Essi devono produrre suoni, da cui vengono poi selezionate forme specifiche, che includono anche le strutture grammaticali.
Per molti anni, alcuni linguisti hanno insistito sul fatto che le regole grammaticali fossero innate nell’uomo. Hanno quindi sostenuto che queste regole determinassero il modo in cui parliamo. Ma recenti studi pubblicati da studiosi del linguaggio hanno dimostrato che queste teorie sono sbagliate.

I moderni linguisti hanno proposto un modello di apprendimento del linguaggio basato sull’utilizzo (used-based approach). Come Skinner, anch’essi sostengono che prima di tutto venga il parlare e solo dopo intervengano le regole, la cui funzione è descrivere le strutture utilizzate dai parlanti. I bambini acquisiscono quindi le forme grammaticali parlando con gli altri. Skinner comunque non spiegherebbe mai lo sviluppo del linguaggio nel bambino come il risultato di un “meccanismo di apprendimento insito in un cervello in via di sviluppo.” Parlerebbe invece di come siano le persone che entrano in relazione con il bambino a plasmarne sia la pronuncia che l’uso della grammatica. E’ dunque la verbal community che rinforza l’utilizzo di determinate forme linguistiche, che possono coincidere o meno con il linguaggio usato dai giornalisti e dagli speaker televisivi.

Japanese Translated by Naoki Yamagishi

「なぜみんなはニュースキャスターの文法や発音について話をしないのでしょうか」と時々質問する人がいます。私たちは確かに彼らの話を聞きます。驚くことではありませんが、その答えはSkinnerの1957年の著書「言語行動」に書かれています。子どもは、話すことを「聞くこと」からは学ばないとSkinnerは明らかにしました。特定の形態が選択されることで、発声します。選択される形態には文法構造も含まれます。
何年もの間、ある言語学者たちは文法規則が生得的なものだと主張していました。それらの規則がわたしたちの話し方を決めていると論じました。しかし、言語学者たちの最近の研究はそれらの理論が誤りであることを示しています。言語学者は、「使用に基づく言語獲得」を提案しています。Skinnerのように、話すことが始まりだと論じます。規則は話し手が使用する構造を記述します。子どもは文法構造を他者と話すことで獲得します。しかしSkinnerは子どもの言語発達を、推測される「発達する脳における学習構造」によって説明していません。その代わり、Skinnerは、養育者が発音と文法をシェイピングすることについて語ります。言語共同体は、ニュースキャスターが話すような音の形態を強化したり、強化しなかったりします。

Polish Translated by Monika Suchowierska-Stephany

Czasami pojawia się pytanie “Dlaczego nie wszyscy wypowiadają się w tak gramatyczny sposób i z taką dykcją jak prezenterzy telewizyjni?” Przecież codziennie słyszymy ich wystąpienia. Odpowiedź możemy znaleźć – co nie jest zaskoczeniem – w książce BF Skinnera „Verbal Behavior” z 1957 roku. Skinner jasno ukazuje, że dzieci nie uczą się mówienia tylko poprzez słuchanie. Wydają one odgłosy, spośród których zostają wyselekcjonowane pewne formy dźwięków. Te wybrane formy dotyczą również struktur gramatycznych.

Przez wiele lat niektórzy lingwiści wyrażali przekonanie, że znajomość zasad gramatyki jest u człowieka wrodzona. Według nich te właśnie zasady określają sposób mówienia. Jednak obecne badania prowadzone przez naukowców zajmujących się językiem obaliły te teorie. Lingwiści zaproponowali „podejście do uczenia się języka oparte na używaniu”. Podobnie jak Skinner, uważają oni, że na początku jest mówienie. Reguły tylko opisują struktury językowe stosowane przez osoby mówiące. Dzieci przyswajają konstrukcje gramatyczne poprzez rozmawianie z innymi. Skinner nie wyjaśniałby jednak uczenia się języka przez dziecko jako wyniku domniemanego „mechanizmu uczenia się w rozwijającym się mózgu”. Raczej mówiłby o opiekunach kształtujących u dziecka artykulację i gramatykę. Społeczność werbalna, w której funkcjonuje dziecko, wzmacnia formy, które przypominają – albo nie – sposób wypowiadania się prezenterów telewizyjnych.

Portuguese Translated by Monalisa Leão

Às vezes, as pessoas perguntam: “Por que nem todo mundo fala com a gramática e a pronúncia dos apresentadores de notícias?” Certamente, muitas vezes ouvimos suas falas. A resposta, não surpreendentemente, é dada no livro de B. F. Skinner de 1957, Comportamento Verbal. Skinner deixa claro que as crianças não aprendem a falar ouvindo. Elas devem fazer sons a partir dos quais formas específicas são selecionadas. As formas selecionadas também incluem estruturas gramaticais.

Por muitos anos alguns linguistas insistiram que as regras gramaticais eram inatas. Eles argumentaram que essas regras determinam como falamos. Mas estudos recentes publicados por estudiosos da linguagem têm mostrado que essas teorias estão erradas. Os linguistas tem proposto uma “abordagem baseada no uso para a aquisição da linguagem”. Como Skin-

ner, eles argumentam que a fala vem primeiro. As regras descrevem as estruturas que os falantes usam. Crianças adquirem formas gramaticais através da fala com outros. No entanto, Skinner não explicaria o desenvolvimento da linguagem de uma criança como resultado da inferência de “mecanismos de aprendizagem em um cérebro em desenvolvimento”. Preferencialmente, Skinner falaria de cuidadores modelando ambos, a pronúncia e a gramática. A comunidade verbal reforça formas que podem, ou não, parecer à maneira como os apresentadores de notícias falam.

Russian Translated by Alexander Fedorov

Иногда люди спрашивают: «Почему все не говорят так, как дикторы ТВ и радио, – с таким же произношением и грамматикой?» Мы, несомненно, часто слышим их. Неудивительно, что ответ на этот вопрос дал Б.Ф. Скиннер в своей книге 1957 года «Вербальное поведение». Скиннер ясно объяснил, что дети не учатся говорить путем слушания. Они должны производить звуки, из которых и отбираются конкретные формы. Отобранные формы также включают в себя грамматические структуры.

Многие годы некоторые лингвисты настаивали на том, что грамматические правила являются врожденными. Они утверждали, что эти правила определяют то, как мы говорим. Но недавно опубликованные работы специалистов в области языкознания показали, что эти теории ошибочны. Лингвисты предложили «подход к усвоению языка, основанный на использовании». Подобно Скиннеру, они утверждают, что сперва идет говорение. Правила описывают структуры, которые используют говорящие. Дети усваивают грамматические формы через разговор с другими. Скиннер, однако, не стал бы объяснять развитие речи ребенка, прибегая к воображаемым «механизмам научения в развивающемся мозгу». Скорее, Скиннер стал бы говорить о родителях и воспитателях ребенка, которые формируют как его произношение, так и его грамматику. Вербальное сообщество подкрепляет формы, которые могут или нет звучать так, как речь диктора.

Spanish Translated by Kenneth Madrigal and Gonzalo Fernández

Hay ocasiones en que la gente se pregunta “¿por qué no todo el mundo habla con la gramática y pronunciacion de los presentadores de noticias?” La respuesta, no es de sorprender, se da en el libro de Conducta Verbal de B.F. Skinner, publicado en 1957. En él, Skinner pone en claro que los niños no aprenden a hablar escuchando; ellos deben hacer sonidos, de los cuales ciertas variaciones específicas son seleccionadas. Asimismo, dicha selección de variaciones no excluye a la de las estructuras gramaticales.

Por muchos años algunos lingüistas insistieron en que las reglas gramaticales son innatas, argumentando que estas determinan cómo hablamos. Sin embargo, estudios publicados recientemente por academicos del lenguaje han mostrado que éstas teorías son incorrectas. Al igual que Skinner, algunos lingüistas han propuesto una “aproximación a la adquisición del lenguaje basada en el uso”, argumentando que el hablar viene primero. Las reglas describen las estructuras que los hablantes usan. Los niños adquieren formas gramaticales a través de hablar con otros. Skinner no explicaría el desarrollo del lenguaje de un niño como un producto de “mecanismos inferidos de aprendizaje en un cerebro en desarrollo.” Más bien, Skinner hablaría del moldeamiento, tanto de la gramática como de la pronunciación, por parte de los cuidadores. Por lo cual, es la comunidad verbal la que refuerza formas de hablar que pueden, o no, sonar a la manera en que los presentadores de noticias hablan.

Swedish Translated by Dag Strömberg

Ibland frågar människor “Varför talar inte alla med en nyhetsuppläsares grammatik och uttal?”. Deras tal hör vi sannerligen ofta. Svaret ges, inte överraskande, i B. F. Skinners bok Verbal Behavior. Skinner klargör att barn inte lär sig tala genom att lyssna. De måste göra ljud från vilka specifika former blir selekterade. De selekterade formerna inbegriper även grammatiska strukturer.

I många år insisterade vissa lingvister på att grammatiska regler var medfödda. De påstod att dessa regler bestämmer hur vi talar. Men nyligen publicerade studier från språkforskare har vederlagt dessa teorier. Lingvister har föreslagit en “användandebaserad inställning till språktillägnande”. Liksom Skinner hävdar de att talet kommer först. Regler beskriver de strukturer som talare använder. Barn tillägnar sig grammatiska former genom att tala med andra. Skinner skulle dock inte förklara ett barns språkutveckling som beroende på antydda “inlärningsmekanismer i en hjärna under utveckling”. Snarare skulle Skinner tala om föräldrar/anhöriga som formar både uttal och grammatik. Det verbala samhället förstärker former som kan låta, eller inte låta, som hur nyhetsuppläsare talar.

Thai Translated by Sirima Na Nakorn

“ทำไมผู้คนจึงไม่พูดด้วยสำเนียงและไวยากรณ์ที่เหมือนกับที่ผู้ประกาศข่าวใช้” ในเมื่อเราได้ยิน และฟังรายการของพวกเขาอยู่ตลอดเวลา สกินเนอร์ได้ให้คำตอบ ที่ไม่น่าแปลกใจเลย ไว้ในหนังสือของเขาในปี ๑๙๕๗ ชื่อเรื่อง Verbal Behavior สกินเนอร์อธิบายไว้อย่างชัดเจนว่า เด็ก ๆ ไม่ได้เรียนการพูด ด้วยการฟัง พวกเขาเลือกที่จะทำเสียงต่าง ๆ ที่มีรูปแบบเฉพาะเจาะจง ซึ่งรูปแบบเฉพาะเจาะจงเหล่านี้รวมไปถึงโครงสร้างทางไวยากรณ์ด้วย

หลายปีที่ผ่านมา นักภาษาศาสตร์บางท่าน ยืนยันว่า กฎไวยากรณ์เป็นสิ่งที่สืบทอดมาโดยกำเนิด และกฎไวยากรณ์เหล่านี้กำหนดรูปแบบการพูดของเรา แต่การศึกษารุ่นใหม่ ทำโดยนักวิชาการด้านภาษา พบว่า ทฤษฐีนี้ไม่ถูกต้อง นักภาษาศาสตร์ ได้เสนอ มุมมองหรือแนวคิดที่ยึดพื้นฐานด้านการใช้ภาษาเป็นหลัก ซึ่งมีความคิดเช่นเดียวกับ สกินเนอร์ คือ โต้แย้งว่า การพูดนั้นพัฒนาก่อน กฎ ฯ เพียงบรรยายโครงสร้างที่ผู้พูดใช้เท่านั้น เด็ก ๆ พัฒนารูปแบบไวยากรณ์จากการพูดโต้ตอบกับผู้อื่น อย่างไรก็ตาม สกินเนอร์ ไม่ได้อธิบายว่า การพัฒนาการด้านภาษาของเด็กนั้นเป็นไปตาม “กระบวนการเรียนรู้ในสมองที่กำลังพัฒนา” แต่ สกินเนอร์ กลับอธิบายถึงสิ่งแวดล้อมมากกว่า ได้แก่ ผู้ที่เลี้ยงเด็กเป็นผู้ปรับแต่ง หรือ ผู้ที่มีอิทธิพลต่อการออกเสียง และ การพัฒนาโครงสร้างไวยากรณ์ของเด็ก ครอบครัว และ สมาชิกในชุมชนที่เด็กอยู่ต่างหาก ที่เป็นผู้เสริมสร้าง และ ปรุงแต่ง สำเนียงการพูด และรูปแบบไวยากรณ์ภาษาของเด็กว่า จะพูดเหมือนผู้ประกาศข่าวหรือไม่

in this issue

editorial staff

Bird by Bird, and Word by Word

essay

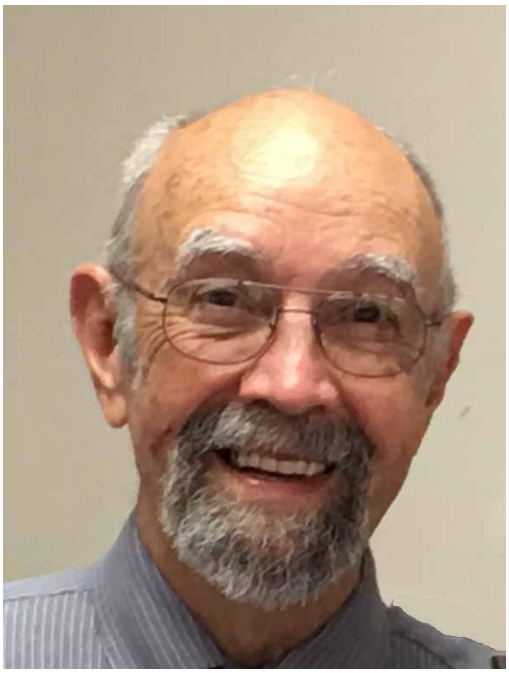
Ernest A. Vargas, PhD
Cambridge, MA

While reading the newspaper my eye caught a book review written by a columnist who writes an occasional nature article, mostly on birds and birding in Central Park in Manhattan, New York City. I enjoy birds. I also enjoy this writer's column. I started to read it. The review surprised me as it turned out not to be about birds, but then neither had the book. Because the reviewer wrote a nature column, in had arrived a book to review titled *Bird by Bird*. The book, however, turned out to be, as its subtitle puts it, *Some Instructions on Writing and Life*. And that is what it is about. It is a fine book and I recommend it. But you are saying, "that can't be the point of your story". It isn't. The title of the book comes from an anecdote the book's author, Anne Lamott, tells. It seems that her brother had the usual school writing assignment. He engaged in the usual behavior of those faced with such an assignment. He had had three months to write the paper. He had written nothing. The report was due the next day. So there he was, sitting at the kitchen table, bird books piled around him, pencils and pen immediately available, and a blank tablet in front of him. He had been there for some time, in despair, about ready to cry, paralyzed by what could never be achieved. "Then my father sat down beside him, put his arm around my brother's shoulder, and said, 'Bird by bird, buddy. Just take it bird by bird'."

An almost casual inference by me: you, graduate students and new professionals, seem to find yourselves in the position of Anne Lamott's brother. For you, writing presents itself as a task of unmanageable effort. I say, "almost casual inference" since your articles are rarely to be seen, and since writing is the means by which such articles are produced, apparently it is an effort too difficult to carry out successfully. Why? It cannot be capability, since a graduate student by definition is someone who has successfully engaged in years of college and university study, and since a new professional typically has succeeded in even more years of advance study. It cannot be experience, since each day graduate students and new professionals encounter sayings and doings that enrich an already vast repertoire. So what is it? Apparently the process of freezing one's repertoire in a form others can easily access and examine intimidates you, the prospective writer.

Writing is at the same time both the easiest and hardest thing to do. It is the easiest since not much in the way of resources is required. It requires only something with which to mark and something on which the mark is left. A pencil and a piece of paper will do, and an eraser helps since it dispatches earlier efforts and unclutters later efforts. And now with the computer, could any writer ask for more? A few strokes of a few keys, and words instantly appear or disappear. In strength, writing requires no more than that of a child's. Stamina is necessary, but you can get by with a modest amount. Because of his illness, Darwin could put in no more than a couple of hours at a stretch, and typically wrote no more than three hours in a day. And writing can take place anywhere. Trollope produced his personal quota of a thousand words a day even when traveling around Ireland as a post-office surveyor. And yet: It is the hardest thing to do since an effective repertoire is required along with the proper contingencies in place and the activity that denotes them.

Schooling, not necessarily school, provides the rudiments of an effective repertoire. The rest comes through practice. You learn to write well only by writing. That is obvious—and you knew that already. But my concern here, and probably yours as well, is not stylistic splendor. That may or may not occur, and furthermore, it is not necessary. Maugham, somewhere, in some essay, comments on how poor the styles of many major writers have been, for example Dostoevsky.



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Writing well simply means that you state clearly what has happened to you; more exactly, what is taking place to one of the repertoires that happens to be located at the locus called "you". In science writing, you want your reader to behave as you have under the circumstances you now describe. Such clarity is hard to achieve. The necessity, therefore, of being provided good feedback to the early approximation of what you finally tender. That's why frequent writing is necessary. By clicking that keyboard and making those marks, you provide an opportunity for your verbal community to shape you. Get that verbal behavior out and then around. So, first: write for yourself to discover what you have to say or be surprised by what you do say. Robert Louis Stevenson once said that he wrote to find out what his characters were going to do. Second, once you've got that down to your satisfaction, send it around to tough friendlies, that is, people who have your best interests at heart so they take the time and trouble to help you come across better. When you do send your manuscript off to a journal keep in focus when you get feedback that journal reviewers should help the writer through a critique not punish through a criticism. Good writing is largely a community effort. The final product shows the effect of your community. F. Scott Fitzgerald told Hemingway that the ending of *Farewell to Arms* was not good enough and Hemingway rewrote it some three dozen times until it was what it should be. But perhaps you knew already the requirements of an effective writing repertoire, or more likely, you knew vaguely what I have now highlighted. Good. We can therefore concentrate on how to achieve that effective writing repertoire by putting in place the proper contingencies to have and to hold the writing behavior.

First and foremost, arrange those tailor-made contingencies. Get yourself a time at which no other competing activities take place. Reflect upon the hazards of "homework". What happens when healthy young bodies who have sat all day are asked to do homework when only a few hours of daylight remain in the day? Right. Then evening; and the best seductions the internet, the t.v., the video games can construct compete against learning polynomial division and the dates of remote events. Better to wear that body out with play, hard or easy, get it to bed early, and get it up early to do what's done faster when there are fewer distractions. Unless you are fresh as a daisy and sharp as a habanero, do not know how to surf the channels or the internet, and cannot say "no" to significant and insignificant others, all sorts of events other than writing will also compete for your end-of-the-day time. The same contingencies that produce lousy homework behavior in school kids produce it in your writing behavior. Better take those contingencies into account—"know thyself". Whatever else that admonition means, it implies knowing the controls over your actions. As science leads to technology, knowing leads to arranging. Situations control actions—so get yourself a nice corner where your emitting can consistently take place. What is good for little doggies is good for you. And finally, as part of "knowing thyself', be realistic on your demands on yourself. Do not expect that pertinent contingencies will do their thing all at once. You know what I am recommending here for you to do. It is, of course, the same advice Anne Lamott's father gave her brother: bird by bird.

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Perhaps there is one further thing I can say—a bit more analytic—that would help you to start writing. You know as well as I do that writing behavior reflects your history. Such a truism helps only in the sense that it dispenses with the notion of a currently inept and inadequate agency, some homunculus perched inside your brain, some inner you responsible for the actions of the outer you. And the truism further dispenses, logically, with any other inadequate homuncular yous, even more deeply hidden ones, responsible for the immediate inner you. In your personal past, prior critical remarks on writing efforts, even when a good grade has been given, take their toll. If conversation were criticized as heavily, most of us would be silent. Note how quiet and circumspect most of us do get when not among friends, and how easy talk comes about in some situations and not in others. Same locus, different loquacity. The amount and form of verbal behavior, whether talking or writing or gesturing, occurs for specific reasons. Those reasons, or as we would say, contingencies, bear on the writing action. Feelings may accompany the actions, but no "I" sits in a director's chair and moves words and sentences to make the proper scene. Writing is not the agency-infused enterprise it is deemed to be.

At the time writing occurs, there is no "you". There is only the effect of prior verbal communities having their play on whatever is being written. Writing, as with any other rich cultural behavior such as speaking, keeps that effect in force. It now affects others. What is said provides an opportunity for prior repertoires to be maintained, and as important, to be shaped into new ones. Note that when seen this way, the "I" and the "you" drop out of the scene. It is one grand nexus of verbal actions, each shaping the other.

What you write constitutes the vectored product of what you have read, what your teachers have said, what you have confronted, what you have felt, and what you have thought—in short, the directional sum of your encounters. An individual is an opportunity for a cultural tradition to take place: Your science writing occurs partly for yourself (if nothing else to clarify what is happening), but mostly for others. Think of writing as a means of lending helping words. Perhaps then you will not be so self-effacing, so shy, so scared of making a mistake. Perhaps then you will work at building your writing repertoire and in so doing build our science community—word by word.

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About the book: You know already that Anne Lamott is the author of *Bird by Bird*. The publisher and year are a little tougher to figure out since I did not mention them—Pantheon, 1994. The quote is on page 19, and there is lots more that could be quoted. It is a sad book in parts, but often it is a funny book and I read parts of it out loud to Julie since it is always fun to get someone else laughing.

Are Psychologists Natural Scientists?

Jerome Ulman, Ph.D., BCBA-D

To begin: as defined in the Merriam-Webster's Collegiate Dictionary (11th ed.), natural science is "any of the sciences (as physics, chemistry, or biology) that deal with matter, energy, and their interrelations and transformations or with objectively measurable phenomena." Clearly, behavior analysis/behaviorology belongs among these three natural sciences. This is the question I address: Are psychologists, experimental or practical, natural scientist too? It would be incorrect to claim that psychology is not a natural science. To the extent that psychologists use behavior analytic/behaviorological technology appropriately, they would be engaged in natural science practice. In practice, however, psychologists range from parapsychology (the study of telepathy, clairvoyance, and psychokinesis) to behavioral psychology (behavior analysis/behaviorology). As Julie Vargas puts it, "As behavior analysts or as behaviorologists, we do not appeal to personality, selfishness, motivation, or other inferred 'agencies' to explain behavior."

Historically, we are well aware how behavior analysis/behaviorology grew from the experimental work in the laboratories of Ivan Pavlov and B. F. Skinner. But where did psychology come from? At an early behaviorology meeting I remember a presentation given by Julian Jaynes on the ancient origins of psychology. Beginning with ancient Greece, he related that the word "psyche" meant whatever left the warrior when he was killed on the battlefield. Pythagoras, upon return from his journey to Egypt brought back with him the concept of the transmigrating soul, one's immortal spiritual part that exists outside of the body.

Subsequently, in his scholastic philosophy, Aristotle initiated what later came to be called "psychology" as a discipline; essentially, a taxonomy of various human faculties. With the rise of Judeo-Christian culture, the psyche and soul become synonymous—the exclusive preserve of the Church during the Middle Ages. For a thousand years, there was essentially no scientific advancement in psychology. It remained strictly within church doctrine.

Next, Descartes launched modern philosophy that advanced new, mechanistic sciences. His philosophy also led to the "mind-body dualism" thesis. His philosophical treatment of "psychology" was not objectionable to the Church. He distinguished between two kinds of reflexes: involuntary, those that humans and nonhumans share in common; and voluntary, those "reflexes" that are uniquely humans by virtue of being processed through the soul (presumed to reside in the pineal gland of the brain). The Church continued to retain its jurisdiction over what is said about the soul. And Descartes was not castigated.

With the emergence of capitalism came the revolutionary development of the natural sciences. Concomitantly, psychology, then as now, was defined as the study of mind and behavior—not as a dialectical contradiction but as separate ontologies; respectively, idealistic and materialistic. Psychology continued to remain a part of philosophy, that part of natural philosophy concerned with the "mind-body" problem—mind and psyche being interchangeable terms that continued to be haunted by the ethereal soul. As Boring noted, the first man to be called a psychologist was Wilhelm Wundt (1832–1920). It is notable that on the American Psychology Association website, psychology is still defined as "the scientific study of the behavior of

J. D. Ulman received his bachelor's and master's degrees in psychology from the University of South Florida in 1965 and 1968, respectively; and his doctoral degree in educational psychology from Southern Illinois University in 1972. In 1974, he came to Ball State University (BSU), where he taught courses in the areas of applied behavior analysis and behavioral disorders, and coordinated an online postgraduate program in applied behavioral analysis. His research interests include behavioral research methodology, behavioral analysis applied in special education, and the sociocultural implications of behaviorology. In 2012, he became Professor Emeritus of Special Education at BSU. His most recent work includes publication of Ulman-Skinner Letters, *and a set of replies to comments in a special issue of the* European Journal of Behavior Analysis.

individuals and their mental processes" — see http://www.apa.org/research/action/glossary.aspx?tab=16.

As the world exists today, what effects has psychology made on our world? Considering psychology as an institution, it has major effects on our culture, as instantiated in the legal system (e.g., court cases decided on the question of sanity, mandated psychological counseling, professional psychologists and psychiatrists as expert witnesses, and so on). In these instituitional settings , psychology puts the blame for problematic behavior *within* the individual, rather than in a dysfunctional social system that generates problems—thus, blaming the victim, not the social conditions.

Returning to psychology as a practice, it was hardly natural-science based until the advances coming from Pavlov's S-R psychology, Watson's behavioral perspective, and B. F. Skinner's research culminating in *The Behavior of Organisms*. From there, Skinner's professional career incorporated the goal of transforming psychology into a natural science. This Sisyphean effort continued until the very end of his career. In his address at the 1989 convention of the Association for Behavior Analysis, Skinner stated: "I have tried too long to follow Watson in saying that psychology is the science of behavior. I am now convinced that is wrong. Psychology has always been concerned with internal explanations." Likewise, we can consider cognitive science similarly concerned with internal explanations. Defined in Merriam-Webster's Collegiate Dictionary, cognitive science is "an interdisciplinary science that draws on many fields (as psychology, artificial intelligence, linguistics, and philosophy) in developing theories about human perception, thinking, and learning."

Psychologists on the "internal explanations" side often criticize Skinnerian science for investigating only observable behavior relations. What they are referring to here, of course, is methodological behaviorism, not Skinnerian science. In explaining behavior, we don't refer to inferred "agencies" (sans behavior) to explain behavior. Psychologists who assert that "behaviorists" do not consider internal events are wrong. As Julie Vargas commented succinctly in *Operants*: "behavior exists inside our skins of course. Like overt actions, internal behavior depends upon contingencies: the relation between existing actions, their results, and the circumstances in which those relations exist." To repeat, behavior analysts/behaviorologists have nothing to say about ethereal "agencies" (with the exception of those committed to relational frame theory).

To conclude with an example, Ernie Vargas and I were invited to contribute an entry on behaviorology in the *Encyclopedia of Behavior Modification and Cognitive Behavior Therapy*, a three-volume encyclopedia. The title suggests and its index demonstrates that cognitive theory dominates. Behaviorology appears on only two pages—in Ulman and Vargas; whereas cognitive is peppered throughout the three volumes. We may not see it now, but I'm confident that the natural science Skinner developed will come to be called behaviorology. Borrowing a recent comment made by President Obama in reference to the current president elect: "Reality has a way of asserting itself." We may not able to predict when it may occur, but given the nature of behavior contingency relations, I believe that sooner or later behaviorology will take its rightful place.

from the archives

Spring of 1990. B. F. Skinner and his daughter, Julie, during their daily walk in Cambridge, MA. Photo from the family archive.

A Brief History of Behavior Analysis in Poland

Academic Institutions, Clinical Programs, Professional Organizations, Conferences, And Publications

around the world

Monika Suchowierska-Stephany, PhD, BCBA-D
Paul W. Stephany, MFT, BCBA

The Beginnings

In the early 1990s, behavior analysis came to Poland in a very practical way. In 1989, Małgorzata Rybicka was seeking help for her son with an autism spectrum disorder, so she became acquainted with Norwegian psychologists who were providing behavioral therapy. Established in 1992 in the city of Gdańsk, The Special Center for the Rehabilitation and Education of Children and Youth with Autism was Poland's first clinic where behavioral therapy was used. Since the clinic's inception, it has been directed by Małgorzata Rybicka. There is no doubt about the effectiveness of treatment methods in maximizing the potential of people with developmental disabilities. These methods have been of a advantage and leverage in the development of ABA in Poland. However, one cannot forget that the procedures used with individuals diagnosed with special needs have been based on earlier basic research.

In 1992, research on the experimental analysis of behavior began in Poland with Professor Paweł Ostaszewski, who had received his doctorate from the University of Warsaw. He collaborated with Professor Leonard Greene of the University of Washington in St. Louis, Missouri, USA. Their research focused on measuring changes in the subjective value of reinforcers and describing changes in the context of discounting. Ostaszewski and Greene established a laboratory program at the University of Warsaw that first conducted animal studies using operant chambers and then moved to basic operant research with humans. Currently, graduate students focus more on applied aspects of discounting, particularly looking at the relationship with nicotine addiction and with abnormal body weight.

Although the work of Professor Ostaszewski's team can be considered the formal beginning of the experimental analysis of behavior in Poland, it should be noted that experimental studies on the processes of learning, in particular classical conditioning, were conducted in Poland in the 1930s by Jerzy Konorski and Stefan Miller. Similarly, behaviorism was present in Polish literature since the 1930s and Władyslaw Heinrich, a professor at the Jagiellonian University, founded the first laboratory of experimental psychology in Poland.

The beginnings of the theoretical analysis of behavior can be traced to the work of Professor Krzysztof Krzyżewski from the Institute of Psychology at the Jagiellonian University, conducted in the 1980s. Although Krzyżewski's work focused on neobehaviorism, it was also related to radical behaviorism. Professors Krzyżewski and Jerzy Siuta from the same university translated from English into Polish many classical works in behaviorism.

Academic institutions

The first Polish program specializing in behavior analysis was established

in 2003 at the Jagiellonian University's Institute of Psychology under the name of the Department of Behavioral Psychology. The founder and head of this department was Professor Jerzy Siuta. This department closed in 2013, but behavioral research is still conducted at the General Psychology Department. This research includes conditioning and learning by observation, the mechanisms of placebo, the process of discounting, behavioral therapy for pain and anxiety disorders, as well as the use of behavioral analysis in psychology, education and health. The Institute of Psychology offers courses in behavior analysis and applied behavior analysis, which are included as one of the pathways to become a Polish Licensed Behavioral Therapist. At this time, the SWPS University of Social Sciences and Humanities in Warsaw was the only university to have a separate department devoted entirely to behavior analysis. The SWPS Department of Behavior Analysis, headed by Professor Paweł Ostaszewski, was founded in 2009, and in 2015 it became part of the Institute of Cognitive and Behavioral Neuroscience. The research conducted by this department is focused on two areas: the process of discounting and teaching methods for typically and atypically developing children.

Since 2006, the SWPS University of Social Sciences and Humanities in Warsaw offers a postgraduate program, "Applied behavior analysis: Working with individuals with developmental and behavioral disorders," directed by Dr. Monika Suchowierska-Stephany and Prof. Paweł Ostaszewski. Since the 2014/2015 academic year, the postgraduate studies program in applied behavior analysis, is also offered at SWPS campuses in Katowice (directed by dr. Przemyslaw Bąbel) and Poznań (directed by dr. Anna Ziółkowska). The ABA postgraduate studies at the three SWPS campuses are on the Approved Course Sequence list developed by the Behavior Analyst Certification Board®; BACB®. It means that graduates of the program who complete the postgraduate studies and meet additional requirements may apply for the international (i.e., the BACB) certification for behavior analysts, as well as the Polish Behavioral Therapist License (see description in the following sections of this paper). Additionally, since the 2011/2012 academic year, the SWPS University of Social Sciences and Humanities in Sopot has offered a postgraduate studies program entitled "Applied behavior analysis - shaping children's behavior" directed by Dr. Monika Zielinska. This program, however, is not on the list of the Approved Course Sequences as prepared by the BACB. Since the 2008/2009 academic year, the Department of Behavior Analysis at the SWPS University of Social Sciences and Humanities in Warsaw has also been offering a specialization module titled "Autism: methods of helping children and their families." The essence of this specialization module is the use of applied behavior analysis for youngsters with autism. During that same academic year, the SWPS University introduced the additional specialization module "Behavioral therapy and cognitive-behavioral therapy in clinical practice." This program was met with great enthusiasm by the students of Psychology in English, especially those interested in the theoretical knowledge and practice of both cognitive-behavioral therapy and applied behavior analysis. In the 2009/2010 academic year, another module was added to the educational roster related to behavioral psychology. This module is titled "Shaping and modifying behavior." This module is devoted entirely to providing students with knowledge and basic skills in applied behavior analysis. Since the 2012/2013 academic year, the Psychology in English Program at the SWPS University in Warsaw has regularly offered courses on behavior analysis, applied behavior analysis and use of behavioral therapy in working with people with developmental disabilities. The latest proposal is an extramural Masters degree program in Psychology with a specialization in behavioral psychology, which was introduced in the academic year 2013/2014. Individuals who complete this specialty can apply to become Polish Licensed Behavioral Therapists.

Behavior analysis is also being developed at the Faculty of Psychology at the SWPS University campus in Poznań where, in addition to postgraduate studies in applied behavior analysis, two modules in behavioral therapy are offered. These modules are "Behavioral therapy: An introduction" and "Behavioral therapy: Practicum." Completion of these two modules also allows students to apply for their Polish Behavioral Therapist License.
The Institute of Psychology at the University of Gdańsk was once an important academic center for behavior analysis. At this Institute of Psychology, Dr. Jacek Kozlowski and Dr. Monika Zielinska conducted research on the use of behavior analysis in education and therapy of children with autism and other developmental disorders. In particular, they examined the relationship between motivating operations and social functioning, language, and problem behaviors. Kozlowski and Zielinska also researched behavior reduction techniques, as well as teaching verbal behavior to children with communication impairment. Unfortunately, neither Dr. Kozłowski nor Dr. Zielińska are still employed by the Institute of Psychology at the University of Gdańsk. A new development at the University of Gdańsk is an offer of postgraduate studies in applied behavior analysis in the 2016/2017 academic year. This course of studies is enlisted as the Approved Course Sequence by the BACB.

Clinical programs in applied behavior analysis

During the last two decades, there has been the widespread development of clinics that use the principles of applied behavior analysis throughout Poland. Since 1992, when the Special Center for Rehabilitation and Education of Children and Youth with Autism in Gdańsk was founded, nearly thirty more centers were established that are providing treatment using the methods of applied behavior analysis. Many of these institutions hold the regulative status of centers cooperating in the Polish Behavioral Therapist licensure system. They offer not only the highest quality of behavioral therapy, but also diagnosis, consultation, training, and internships for applicants seeking the Polish Behavioral Therapist License.

Most of the clinics that are applying the principles of applied behavior analysis specialize in the treatment of

children and adolescents with developmental disorders, in particular autism. However, there are other treatment centers offering assistance to other populations in need. For example, since 2004 in Gdynia and since 2009 in Gdańsk, the Centers for Professional and Social Activation for Adults with Autism "Living Together" have been offering learning opportunities through job-related activities, independent living skills, and the development of interests to older individuals with autism. Additionally, in Gdańsk the Association for People with Autism established a group home for adults with autism, where clients can live while learning and participating in therapy. Moreover, several institutions offer help for individuals in need but without the diagnosis of autism. For example, the Outpatient Behavioral Therapy Clinic of the Polish Association of Behavioral Therapy in Kraków, with its branches in Wrocław and Racibórz, offer help for children with emotional and behavioral disorders. In Kraków, the Polish Association for Behavioral Therapy also created the Center for Developing Potential of Learning and Behavior Analysis (I CAN). The goal is to establish the first school in Poland that employs applied behavior analysis in the education of typically developing children. The first stage of this I CAN project was the establishment of a private special education primary school and a special education middle school in 2014. In the future, both schools will become part of the I CAN Center.

Professional organizations

The first Polish association of individuals who were interested in behavior analysis was the Polish Society for Behavior Analysis (PTAB). The Society was founded in 1999 in Gdańsk, and it was entered into the National Court Register by 2004. The aim of the Society was to develop and disseminate knowledge about behavior analysis as the science of behavior and the radical behaviorism of B.F. Skinner as the philosophy of that science. The focus of the Society was both experimental analysis of behavior and applied behavior analysis. PTAB's first president was Dr. Jacek Kozłowski followed by Dr. Monika Suchowierska. The two most important achievements of PTAB were the organization of the Second Conference of the European Association for Behavior Analysis and the conference entitled "Behavioral Psychology: Theory, Research, Applications." PTAB also organized discussion meetings in Gdańsk and Warsaw, where participants became acquainted with the latest research and ideas in the field of behavior analysis. PTAB was the first Polish association that became an affiliated chapter of the Association for Behavior Analysis International (ABAI).

In November 2009, at a special general meeting of its members, the PTAB decided to dissolve the society. Members of the disbanded PTAB joined the Polish Society for Behavioral Psychology (PTPB). The aim of the merger of the two professional organizations was to consolidate the work on the development of behavior analysis in Poland. Both associations had similar objectives and their members worked closely with each other on their implementation. ABAI agreed to move the status of an affiliated chapter from PTAB to PTPB.

Subsequently, today there are two nationwide associations in Poland with the purpose of the development and dissemination of behavior analysis: The Polish Society for Behavioral Psychology (PTPB) and the Polish Association of Behavioral Therapy (PSTB). Both were established in Krakow in 2002. The Polish Society for Behavioral Psychology (PTPB) consists of individuals interested mainly in experimental and theoretical analysis of the behavior, but also includes representatives of applied behavior analysis. Polish Association for Behavioral Therapy (PSTB) consists of people interested in applied behavior analysis. The activities of both associations are complementary. Both organizations work closely together, which is reflected in many joint initiatives. The president of PSTB since the inception of the association is Dr. Nela Grzegorczyk-Dłuciak, and the president of PTPB since the inception of the society till 2011 was Dr. Przemyslaw Bąbel, followed by Dr. Łukasz Paw. In October 2010, the governing boards of the PTPB and the PSTB established a joint initiative to unify the formal requirements for behavioral therapists throughout Poland. As a result, The Polish Behavioral Therapist License (PLTB) was created. The PLTB is a consolidated and structured training system, and its task is to define professional standards for specialists within the field of behavioral therapy and to ensure the highest quality of service. To earn the title of Polish Licensed Behavioral Therapist, an individual can take one of six formal paths, each of which requires work within three areas. The first area is to acquire basic theoretical knowledge from courses or modules that have been approved by PLTB. The second area is an internship in one of the model clinics for behavioral therapy. The third area is work experience under close supervision. Each individual track is varied in the number of hours required for each of the three areas, and each track depends on the educational and professional experience of the person applying to become a licensed behavioral therapist. After having met the requirements specified by one of the six tracks, an applicant must undergo evaluation of practical skills, and this involves a comprehensive assessment conducted by two supervisors. To obtain the professional title of a behavioral therapist, the individual must obtain an assessment of at least 4.0, out of a maximum score of 5.0, providing a demonstration at a high level of knowledge and the application of behavioral techniques. Next, the applicant is awarded a license as a behavioral therapist and her or his name is entered on the register of Licensed Behavioral Therapists. It should be emphasized that the license is not indefinitely granted, as it must be renewed every 5 years. In order for the license to be renewed, the behavioral therapist must be evaluated, and s/he must obtain a sufficiently high score, as well as demonstrate proof of continuing education in applied behavior analysis. A similar process is followed when it comes to becoming a Licensed Behavioral Supervisor.

The registries of Licensed Behavioral Therapists and Licensed Behavioral Supervisors were created in order to provide consumers with a list of qualified individuals in the discipline of ABA. The registries provide assurance that licensees have experience and knowledge to effectively

practice as behavior therapists and behavior supervisors. At this time, there are 190 Licensed Behavioral Therapists and 26 Licensed Behavioral Supervisors in Poland. More than 1,000 individuals are in the process of meeting education and experience requirements to become licensed. There are 11 clinics in the PLTB system where applicants do internships.

Conferences

One outcome of the intensive development of behavior analysis in Poland is the increasing number of symposia and conferences on both a national and international level. To date, Poland has held 12 international conferences in the field of behavior analysis, including six of the International Scientific Symposia of the Polish Society for Behavioral Psychology.

The First International Conference on Behavioral Therapy for People with Autism took place in Gdańsk during June 2002. The materials from this conference were published in a book edited by Małgorzata Rybicka, and the book was titled *Behavioral Therapy for People with Autism. Selected Issues*. One special achievement for the Polish Society of Behavioral Analysis (PTAB) was the organization of the Second Conference of the European Association for Behavior Analysis held in Gdańsk in September 2005. Also in Gdańsk, the Second International Symposium "Early behavioral intervention of children with autism - Research" took place in December 2007, as well as the Third International Scientific Symposium "Effective ways to teach children with autism: Practice and research" in March 2009. The International Scientific Conference "Children and adults with autism - how can they effectively help you?" was held in Kraków in October 2006. The conference "Behavioral Psychology: theory, research, applications" took place in Warsaw in April 2008.

Warsaw, Poland

The most important event for behaviorists in Poland is the Scientific Symposium of the Polish Society for Behavioral Psychology. This annual symposium was established 2005 and takes place around March 20th, B. F. Skinner's birthday. The first six symposia were held in Kraków and were organized in collaboration with the Institute of Psychology at the Jagiellonian University. Since 2011, the symposia have been held in Warsaw and have been co-organized by PTPB, the Department of Behavior Analysis at SWPS University and STEP BY STEP — the Foundation for Children with Developmental Disorders and Their Families.

One aim of the symposia is to present theoretical issues, and additional aims are the research results and the practical applications of behavioral psychology. Presentations cover a range of issues from the perspective of behavioral psychology, even if a proposed perspective is not a mainstream or widely known approach to the problem. Symposia are an opportunity for behaviorists in Poland to meet, exchange views and discuss cooperative endeavors.

The symposia also provide an occasion to present behavioral psychology to psychologists from other orientations. Since 2010, the symposia have become more international with eminent representatives of behavior analysis, and in particular applied behavior analysis in Poland and in the world. Below are titles of the last five symposia of PTPB:

- 2011: The VII International Scientific Symposium of PTPB "Behavior Analysis: Perspectives on Verbal Behavior"
- 2012: The VIII International Scientific Symposium of PTPB "Applied Behavior Analysis — evidence-based and effective treatment for developmental disabilities"
- 2013: The IX International Scientific Symposium of PTPB "Developmental Disabilities from the perspective of behavior analysis and childhood psychiatry"
- 2014: The X International Scientific Symposium of PTPB "Problem behaviors from the perspective of behavior analysis and psychiatry"
- 2015: The XI International Scientific Symposium of PTPB "The Clinical Context Of Behavior Analysis: Three Waves Of Behavior Therapy"

Publications

In Poland publications in the field of behavior analysis, as well as publications about the broader category of behavioral psychology, are unfortunately inconsistent and fragmentary. When we started searching for these publications, we assumed there would be few publications. However, it turned out that the number of publications has significantly increased over the last few years. Nevertheless, considering the number of publications representing different fields of psychology (humanistic, psychodynamic, cognitive, etcetera) available to Polish readers, behavioral publications are still a "drop in the bucket."

Another unfortunate fact is that mainstream psychology textbooks, as well as publications on the history of psychology and developmental psychology, often show a clearly outdated and massively misleading picture of

modern behaviorism and behavior analysis. The most common misunderstandings and errors made in textbooks are claims that the behavioral approach: 1) ignores the role of genetics and biological factors as influencing behavior of an organism, 2) does not address internal processes (such as thinking or emotions) and 3) "has died," which means it belongs to the history of psychology, not to modern psychology. Another mistake is the over identification of negative punishment as a primary intervention. It is regrettable that the students reading introduction to psychology textbooks encounter the many mistakes and form a wrong perspective of modern behavioral psychology and behavior analysis. After graduation, many of these students underestimate the value of ABA in many different aspects of life, including education, management, and medicine.

Many books, chapters and articles translated from English into Polish are not free of defects. The reason for this is a lack of consistently used and accurate ABA vocabulary in Polish. This situation became the impetus for writing two books on behavior analysis that included an English-Polish glossary of behavior-analytic terms. These books are as follows:

"*Behavior Analysis from A to Z*" written by P. Bąbel, M. Suchowierska and P. Ostaszewski for which the authors received a SABA International Grant. The forewords to this book were written by prof. W. Joseph Wyatt and the late Jerry Shook. The book was published in 2010.

"*Behavior Analysis. Vademecum.*" written by P. Bąbel, M. Suchowierska-Stephany and P. Ostaszewski. The foreword to this book was written by Prof. Jane Howard and Mrs. Suzanne Letso. The book was published in 2015.

Behavior analysis is a science with three areas of interest: experimental (experimental analysis of behavior), practical (applied behavior analysis) and theoretical (theoretical behavior analysis). The identified publications are organized in those areas. Unfortunately, some of the publications are difficult to classify so we have made decisions based on our own judgment as to the dominant type of content. We encourage the reader to become acquainted with each category, regardless of his current interests: practical, research, and theoretical. Each of the three categories is also divided in the development of books, articles and chapters in books and edited works of popular characters. We only present the publications that were written in Polish, regardless of whether they were originally written in Polish or translated to Polish from other languages. Publications in English, also written by Polish behavior analysts belong to the world of science, so their presentation is beyond the scope of this article (behavior analysis in Poland). Nevertheless, it is worth noting that many Polish analysts publish the results of their research in English-language journals, both published in Poland and abroad. A good example of the former is one issue of the journal *Progress of Medical Science* (1/2013) edited by prof. Irena Namysłowska and Dr. Monika Suchowierska, devoted entirely to issues of disorders of psychological development of children and youth and behavioral methods of treatment. Among the authors of articles in this issue are renowned experts in the field of behavior analysis from different countries of the world.

To summarize the behavioral literature in Polish we found the following:

- Within the area of experimental analysis of behavior (EAB), we have identified 3 ABA books, 7 book chapters, and journal articles.
- In the area of ABA, we found 29 books and monographic publications, 61 book chapters and journal articles, and 22 popular articles.
- In the area of theoretical analysis of behavior, we identified 19 books, 49 book chapters and journal articles, and 18 popular articles.

Conclusion

It is very important to view the development of behavior analysis in Poland with the understanding that until 1989, Poland had been an occupied country for fifty years – first by the Nazis and then by the Soviets. A half century of occupation prevented Polish psychologists from accessing research and information from the Western world. When that context is taken into consideration, it becomes clear that Poland has made remarkable progress in the development and dissemination of behavior analysis. While ABA is still an emerging science in Poland, the foundation has been established for continued growth.

Disclaimer: Parts of this article have been translated from Chapter 6 in "Behavior analysis. Vademecum." written by P. Bąbel, M. Suchowierska-Stephany and P. Ostaszewski.

Monika Suchowierska-Stephany received her PhD in developmental and child psychology from the University of Kansas, Human Development and Family Life Department, in 2003. In 2004, she joined the faculty of Psychology Department at SWPS University of Social Sciences and Humanities in Warsaw, Poland. In 2005, she founded the Center for Early Intervention "Step by Step"—the first behaviorally oriented private institution in Warsaw that provides early intensive intervention to children with autism.

From 2010 to 2013, she served as the Vice-Dean of the Psychology Department at SWPS. In 2010 she was a Fulbright Scholar at California State University, Stanislaus. From 2006 to 2009, Dr. Suchowierska served as the president of the Polish Association for Behavior Analysis and currently is the vice-president of the Polish Society for Behavioral Psychology. Monika is the first Board Certified Behavior Analyst in Poland.

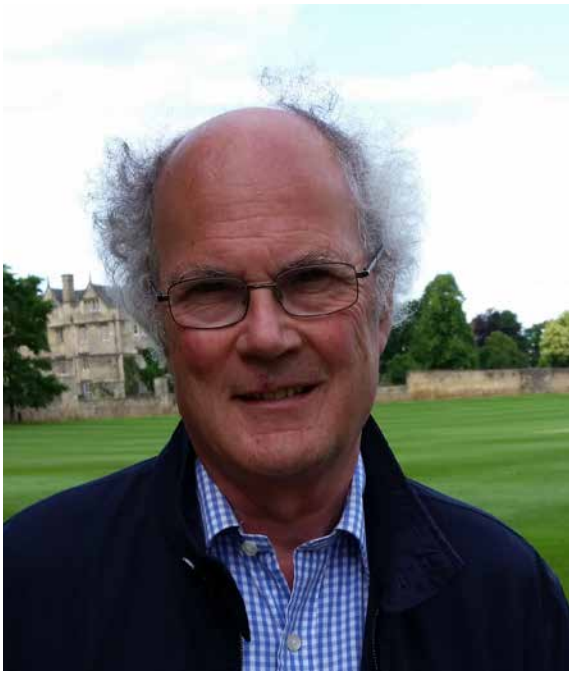
Paul W. Stephany, MFT, BCBA is a licensed marriage and family therapist, and a Board Certified Behavior Analyst. He has over 20 years experience working with children with autism, developmental disabilities, and severe behavior problems. He is an approved supervisor with both the Behavior Analyst Certification Board and the Polish Board for the Licensure of Behavioral Therapists. Before moving to Poland in 2014, Paul worked as a behavior analyst for the Stanislaus County Office of Education and taught graduate courses at California State University, Stanislaus.

Privately, they enjoy quiet time in the mountains together, and devote full attention to their beloved sons.

books

Marc Richelle
B. F. Skinner: A Reappraisal

Review by Julian C. Leslie, PhD
Ulster University
Northern Ireland, UK



Julian Leslie, Professor of Psychology, Ulster University, Northern Ireland

I was fortunate to study at Oxford University during a period when Jock Millenson, who obtained his PhD in operant conditioning under William Schoenfeld, was on the faculty. I obtained my doctorate from Oxford University in 1974 since when I have been in academic posts in Northern Ireland. As well as many journal articles, I published textbooks in 1979, 1996, 2000, and 2002 (the 1996 volume was reprinted until 2008 and remains in print, and the 2002 text also remains in print). As well as teaching undergraduate and postgraduate courses, I have successfully supervised 44 students who have obtained PhDs in fields including experimental analysis of behaviour, applied behaviour analysis, behaviour pharmacology, behavioural neuroscience, experimental psychology, applied psychology. Three recent PhD's were concerned with behavioural strategies to address environmental issues. In 1977 I was co-founder of the group, Behaviour Analysis in Ireland which became a chapter of ABAI. In 2004, the group became the Division of Behaviour Analysis of the Psychological Society of Ireland, and I am currently the Division chair.

Marc Richelle is an important figure in European behaviour analysis, not least because in the 1980's he hosted two major meetings—the 1st and 2nd European Meetings for the Experimental Analysis of Behaviour—at the University of Liege in Belgium. A few years after Skinner's death, Marc Richelle published a book appraising, or re-appraising, all of Skinner's work. Surprisingly, few books have attempted this, and this one still holds interest, especially for behaviour analysts.

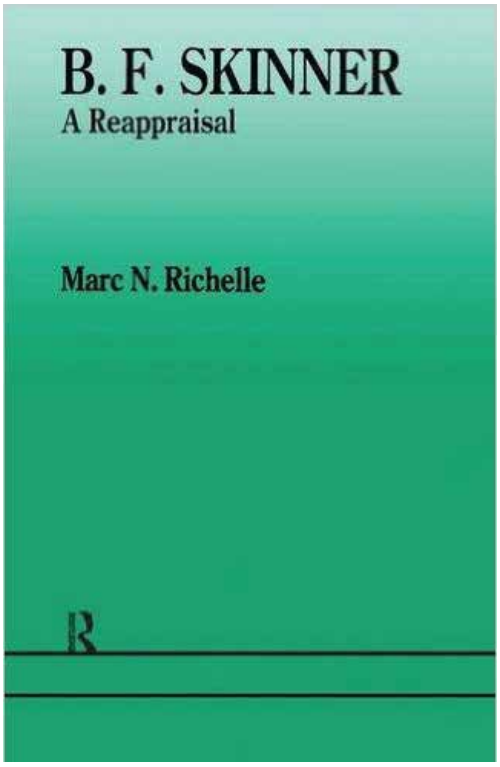
In his opening remarks, Richelle sets out an agenda for the book. He wants to correct many misconceptions of Skinner's ideas and thus allow the reader to understand Skinner's wide ranging contributions. He will do this by developing several themes, which he sees as deriving from a French-speaking European's view of Skinner's body of work; and he wants to respond to some of the unpleasant and completely unjustified personal attacks that Skinner endured in his lifetime, some of them originating in Europe.

The book is extremely coherent and it is possible to track the several themes as Richelle first reviews briefly Skinner's core ideas and research on operant conditioning, then examines Skinner's work in relation to several key European influences on psychology, then relates radical behaviourism to issues in neuroscience and cognition, and finally summarises Skinner's approach to mental health, education and his broader social philosophy. While it is the section on other Europeans that is most distinctive, the whole book is imbued with "Richelle' s behaviourism" which is related to, but not identical with Skinner's radical behaviourism.

Richelle identifies Skinner as one of a dozen great minds in twentieth century psychology, having contributed a school of thought (radical behaviourism), a procedure (using the operant chamber often referred to as a Skinner box), a concept (operant conditioning), a general theory (that behaviour is controlled by consequences), and a social philosophy. Given Skinner's significance why, Richelle asks, was he subject to vitriolic personal attacks over a long period and even in obituaries? For example, "Chomsky, the famous linguist, did not hesitate to accuse Skinner of Nazism, by resorting to unambiguous metaphors" (p. 5). Those of us still working in the field of behaviour analysis know that this type of disgraceful allusion still goes on. Richelle suggests that it mostly happens because of pre-existing biases in those making the attacks, and not because Skinner was unclear in what he wrote. The error lies in unscholarly, if not disreputable, behaviour outside the field of behaviour analysis and is thus hard to eradicate. Just like Chomsky, many subsequent public intellectuals have attacked Skinner without bothering to read what he wrote. These attacks are in Richelle's view motivated in Europe in part by ethnocentrism and a dislike of everything American as well as by Skinner's anti-mentalism, but sometimes they are attacks on so-called S-R psychology — an approach which Skinner repeatedly rejected, or even on his family life.

Although the personal life of a scientist is separate from his scientif-

ic contribution, Richelle includes a sketch of Skinner's early life to rebut some of the spurious personal attacks. Richelle reminds us that Skinner first tried to be a creative writer before taking a PhD in psychology. Skinner told us, tongue-in-cheek, that because he failed as a creative writer he decided that science must be a better way for him to explain human behaviour. Richelle points out that while Skinner's empirical science contribution was mostly from the 1930's to the 1950's in operant conditioning studies with rats and pigeons (from *The Behavior of Organisms, 1938* to *Schedules of Reinforcement, 1957*), his wider interest in human behaviour was well-established by the 1940's with *Walden Two* appearing in 1948 and *Science and Human Behavior* in 1953. He also became interested in applied problems in that period, and his work on these is further discussed in the final section of the book (outlined below). Skinner was not authoritarian (unlike Pavlov, for example) and always held a broadly liberal set of values. At home or in the lab, he was very handy and liked to make gadgets. Amongst these was the "aircrib", a comfortable environment for his baby daughter to move around freely and safely within. Richelle tells us how this humane and useful innovation was misrepresented, in fact lied about, by detractors who claimed his daughter was kept in a "Skinner box" and had subsequently gone mad! In fact, she grew up fit and healthy with an excellent relationship with her father.



Richelle, M. (1995). *B. F. Skinner: A Reappraisal*.

Richelle includes a chapter explaining the concept of the operant and the general features of what is usually called the operant chamber. He reviews research, including his own, using the operant chamber in experiments designed to elucidate aspects of the "inner worlds" of animals previously thought inaccessible, either because we usually rely on spoken responses (or equivalent) to address the corresponding research questions with humans, or where mental processes are invariably invoked to explain human performance. For example, he describes a study where pigeons successfully classified visual stimuli which depicted various rotated versions of complex three-dimensional objects, a task believed to involve rotation of mental images when completed by humans.

Pavlov is the first European figure that Richelle relates to Skinner. In reviewing Pavlov's contributions to the study of learning, and what Skinner took from Pavlov, Richelle expresses regret that by including the term "conditioning" in operant terminology and by typically carrying out operant conditioning studies on simple motor acts, rather than complex sequences of behaviour, Skinner allowed his detractors to describe operant conditioning as simplistic and uninteresting: "A bird building its nest, a spider spinning its web, a sheep mothering her lamb are undoubtedly more attractive than a rat pressing the same lever hundreds of times" (p. 48).

Richelle notes that Skinner and Pavlov shared a commitment to working with representative response systems to establish general laws of behaviour. However, the power of the Skinner box in analysing behaviour and in pursuit of those general laws may, in Richelle's view, have contributed to the misrepresentation of Skinner's general position and interests. Richelle speculates that the plethora of studies on schedules of reinforcement that were published in the 1950's and 1960's by many researchers eager to show what could be done with the Skinner box may have distracted from readings of Skinner's theoretical writings at that time, which concerned human psychology in general. Perhaps even more importantly, operant research in that era was very much concerned with selection of behaviour rather than variation in behaviour. At several points in the book, Richelle emphasises the critical link between variation and selection of operant behaviour, and the need to research both aspects to provide a more complete account of the role of learning in human psychology.

Skinner did not cite many other authors in his own writings, but, Richelle notes, Freud is referred to by Skinner far more often than anyone else. Richelle also points out that Skinner and Freud agree on one key issue which unites them against both traditional mentalism and contemporary cognitivism: the causes of human behaviour are not usually accessible to consciousness, and therefore introspective reports should not be the basis of psychology or a science of behaviour. Put like this, it is clear that Freud and Skinner provided a route away from Cartesian dualism, while cognitivism is stuck with the paradoxes about causation that dualism engenders. Skinner also admired Freud's careful and extensive use of the analysis of individual cases, and to some extent was prepared to overlook Freud's invocation of internal mechanisms because Freud believed that knowledge of neural mechanisms would eventually replace those speculations. However, Richelle notes that what he terms epistemological cognitivism now dominates psychology, and that this approach relegates behaviour to a "by-product of internal agents, with little interest in its own right, at most a useful indicator of mind and cognitive processes, until direct methods will be discovered to analyse them" (p. 62). While this broadly agrees with Freud's epistemology, cognitivism favours rational control of behaviour but Freud favours emotional control, with those emotions being the long-term consequences of underlying psychic conflicts.

As well as Pavlov and Freud, Europe in the 20th century also contributed the ethological tradition to the study of

behaviour. Richelle reminds us that ethologists usually reject the validity of the findings of operant conditioning because the use of restrictive experimental situations may impede the natural repertoire of animal behaviour. In this they are diametrically opposed to Skinner (and indeed Pavlov), and Lorenz, as the leading European ethologist, wanted to maintain this opposition. However, a group led by Thorpe in the UK did attempt some rapprochement. In 1966, Skinner wrote the first of several papers pointing out the analogies between natural selection and operant conditioning, and thus it is entirely false to accuse him— as some still do—of ignoring the biology of behaviour. Nonetheless, Skinner, like Watson before him, emphasised the impact of the individual's *interaction* with the environment. As Richelle says, "Skinner has warned that sources of behaviour should not be reduced to the phylogenic factor without convincing evidence that other factors are indeed negligible, which is rarely the case, especially in humans" (p.72). Indeed, given the complex social environment in which humans live it is hard to envisage an account of individual behaviour which fails to emphasise the powerful and idiosyncratic role of the individual's learning history in accounting for that person's current behavioural repertoire. These ontogenetic factors will, of course, interact with phylogenic factors; thus it is easier to learn to be afraid of spiders than, say, bunches of flowers.

In the period that Skinner was most influential in American psychology, Piaget was probably the most influential person in European psychology, but, Richelle tells us, they largely ignored each other, although Piaget sometimes attacked behaviourists in general, and Skinner sometimes criticised Piagetian concepts as mentalistic. Richelle regrets that this lack of communication has contributed to the strange current state of affairs whereby "learning" and "cognitive development" are usually seen as completely unrelated fields in psychology. Sadly, it is still true that a psychology student, studying the usual range of courses, might come to the view that a child's behaviour changes sometimes as a consequence of development and sometimes as a result of learning, but not realise that most often both processes are simultaneously modifying behaviour. More positively, Richelle notes that both Piaget and Skinner saw psychology as biological rather than social science, they both believed in the primacy of action, they stressed the importance of interaction between behaviour and the environment, and pointed out the analogy between variation in behaviour and the variation that is critical to natural selection. This is a strong list of similarities, but as with Freudians, it is unlikely that followers of Piaget acknowledge any links with Skinner's thought.

What does Richelle's scholarly review of the relationships between Skinner and major European figures in psychology give us overall? The historical links with Pavlov are important and well-known (although interpreted differently according to the background and interests of the interpreter). The links he identifies with the other figures and subfields are all interesting and informative, but leave me with some feelings of regret. Differences in assumptions and terminology, and interdisciplinary hostility and capacity for misrepresentation, mean that it can be difficult to identify communalities such as these or obtain agreement that they exist. Not unreasonably, Richelle takes a more positive view of his own review, "We have met a thinker less close to Pavlov than is usually thought; an admirer of Freud although radically critical of some of the psychoanalyst's views; surprisingly convergent with Piaget in what could be called their interactionist selectionism; quite open to Lorenz's objections to his own account of behaviour" (p. 222). As in other areas, Richelle's defence of Skinner against ill-founded criticism is both robust and well-grounded in careful analysis.

In relation to contemporary biology, Richelle takes up two further unfounded criticisms of Skinner: that he ignored events in the brain, and that his incorporation of an evolutionary model in his later writings was superficial. Skinner was always opposed to what we might now call neuroreductionism, the tendency to regard known or invented brain states as explanations of observed behaivoral phenomena. More positively, he asserted that a systematic science of behaviour was essential to map on to the findings of neuroscience. Richelle tells us that Skinner appealed for some of the resources allocated to neuroscience to be shifted to the science of behaviour, but I am sure that the differential has continued to shift inexorably toward the further support of neuroscience in the ensuing years. Perhaps going beyond Skinner, Richelle argues that psychological processes need to be mapped on to neural ones forthwith, otherwise psychology will lose credibility. That is perhaps an extreme position to adopt as, although there must be a systematic relationship between behavioural and neural processes, there is not necessarily a one-to-one mapping.

On the relationship between operant conditioning and natural selection, Richelle notes that in later years, rather than downplaying this, "Skinner develops the view that the same process, i.e., selection upon variation, accounts for changes observed at all three levels of life; the level of species or biological evolution proper, the level of individual learning… and the level of cultural or social practices" (p. 96). Richelle takes the view that these are strong claims (compared with the more common view that there is merely an analogy between operant conditioning and natural selection) and thus testable hypotheses may be generated. Critics of Skinner have also pointed out that within behaviour analysis little research has been done on the critical process of variation, and this is probably a fair comment.

Richelle provides an extended account of four species of cognitivism, but only one of these, which he terms "radical cognitivism" received extended criticism by Skinner. According to Richelle, in radical cognitivism mental processes should be our exclusive focus, with observed behaviour merely being a by-product, albeit a useful one. Interestingly—to me at any rate—Richelle regards Anthony Dickinson as the arch-exponent of this position. Much of Dickinson's research was done (in the UK) with Skinner boxes in animal labs, illustrating the point that Skinner provided a technique that has been widely used on many topics by researchers with varied theoretical orientations. Skinner's attacks on radical cognitivism were motivated by his belief that it involves a retreat to pre-scientific concepts and is popular because it reinstates familiar terms ("belief", "mind" etc.). Richelle notes that in cognitive psychology the term "representation" is used for dozens of different concepts, usually undefined. Rather than ignoring private events, Skinner provided an

initial account of them within the terms of behaviour analysis in a paper in 1945 and, "laid the basis for further elaboration of a conception of self-knowledge and consciousness as rooted in an individual's interaction with a verbal community" (p.112). This was further developed in *Verbal Behavior* in 1957 and provided a starting point for a behavioural account of consciousness which, again, avoids the slip back towards Cartesian dualism which bedevils most contemporary account of the so-called science of consciousness.

In critiquing cognitivism and cognitive psychology, Skinner made two main arguments: 1) cognitive psychology attributes implicit knowledge of rules to the person, where all that is seen is organisation in behaviour; 2) cognitive psychology has revived "copy theory" which simply moves the external world inside the mind of the observer, leaving all the problems of psychology unchanged. Richelle emphasises Skinner's Interactionist credentials which he shared with William James and Piaget, "for Skinner, as for many psychologists outside the cognitive school of thought, the organism is changed throughout its interaction with the environment, that is to say the world around has no existence, nor can it be represented, independently of the subject's actions" (p. 114). Richelle devotes considerable space to the "language issue", seeing this as a critical area of debate, and one where tactical errors led to apparent defeat for behaviour analysis, but subsequent research has gradually moved modern linguistics closer to Skinner's analysis. The defeat (my term, not Richelle's) came of course following Chomsky's 1959 review of *Verbal Behavior*. Richelle effectively demolishes Chomsky's position but acknowledges, as we all do, that the time for that demolition to be important would have been 1960, not 1995 (or 2016). For Richelle, the key issue is that Skinner provided a functional analysis of language and this, having been completely misunderstood by Chomsky, has gradually been adopted by subsequent linguists but without recognising Skinner's contribution. Skinner may have contributed to this lack of recognition by rarely writing about issues in developmental psychology, and by ignoring conventional linguistic theory when he wrote *Verbal Behavior*.

Skinner maintained that thinking is part of behaviour and, like all human behaviour, is controlled by its interactions with the environment. He considered, and rejected, a Watsonian view that it necessarily involves the musculature involved in overt speech, and concluded that the same processes maintain and influence thinking as they do other behaviour. He suggested that, in many cases, behaviour is covert because the overt form may be punished, and recovery in the absence of punishment may take some time. Thus, we are reluctant to talk outloud to ourselves because it is not socially acceptable, but do so in old age when living alone. He described a continuum in intensity of verbal behaviour from shouting through talking and muttering to types of thinking, but maintained we should give no special status to covert behaviour, or thinking. Richelle approves of this radical solution to a central problem of psychology, and realises that those outside the field of behaviour analysis find behavioural accounts of thinking and consciousness particularly hard to accept: "Science has shaken many of our beliefs, and those related with our self-image are more tenacious than others. No wonder they recur on any possible occasion before leaving the stage forever" (p. 146).

Turning to real life concerns, Skinner was instrumental in the 1950's in providing an alternative to the prevailing view that psychoanalysis was the prism through which to view mental health issues. He strongly advocated the notion that abnormal behaviour was just behaviour and thus controlled by the same processes as so-called normal behaviour. While he criticised Freud, he accepted that the origins of problematic behaviour might lie in a person's early life, and there is a role for biological causes or correlates. Richelle notes that in the same era, and starting from different premises, the "antipsychiatrists" held similar views and both sought to improve the social environment rather than just treating its victims. Even when biological factors are definitely implicated, Skinner stressed the relevance of behavioural treatments. A modern example of this would be the extensive and effective use of applied behavior analysis for children with autism, a condition for which genetic influences are well established. Richelle reviews two types of objections to behavioural approaches to mental health issues. First, that this is only treating symptoms of an underlying and thus persistent disorder. To this, Richelle replies that behaviour analysis sets behavioural objectives and thus can provide objective evidence as to whether the disorder persists or recurs. Second, Rogerians object to the control of the client by the therapist, even when positive reinforcement is used. To this, Skinner replied that all therapies are controlling insofar as they change behaviour, but some types maintain "the illusion of freedom" (p. 160). Richelle goes further, "The history of the main methods of psychological intervention show (sic) that they have bred two diverging tendencies, one favouring the adjustment or reinsertion of the individual, the other promoting their liberation. What is paradoxical is that schools of psychotherapy that rely on the subject's internal resources and do not make controls explicit, are especially exposed to being supported by the controlling agencies, the excesses of which have made them necessary" (p. 161).

Skinner was unusual among famous psychologists in coming up with practical solutions to educational problems. Many of his ideas were embodied in the teaching machines developed in the 1960's, including active learning, reinforcement, individualised teaching programmes, errorless learning, gradual progression and the use of modern technology. Richelle wryly remarks that no-one seemed to like teaching machines in the 1960's, but computer-aided instruction is now widely encouraged. The use of the term, "machine", was not suited to the zeitgeist of that time, and it was believed that there was more to learning than the accumulation of gradually increasing performance levels in specific subjects. While educationalists still make similar pronouncements, most education systems in the Western world are now desperate to ensure that basic skills are imparted effectively in the early years of education, and we have online courses available that utilise many of the principles of behaviour analysis, usually without acknowledgement.

Skinner, Richelle tells us, was very critical of the school system he discovered as a parent when his own

children were of school age. In those schools, scientific knowledge was not applied. They were inefficient, punitive methods were used, and there were arbitrary limitations on individuals' attainments. However, unlike some reformers in the 1960's and 70's, he didn't want to scrap schools, but rather to reform them so that positive reinforcement was used with teachers who had been properly trained and were appropriately paid. As in his teaching machines, schools should specify objectives, teach basics first, program the subject matter systematically, and allow students to go at their own pace. These are, of course, all cardinal features of ABA schools for children with autism when best practice is followed, but are less often present in mainstream schooling. Skinner was very interested in creativity, which he saw as novel behaviour and a form of problem solving, but, "Skinner emphasised the necessity of technical mastery in a given field before creative behavior can emerge" (p. 176). Something similar has now emerged in pop psychology in the form of the "10,000 hours rule".

Richelle is very interested in Skinner's ideas about society and possible utopias, and asks whether or not Skinner's claims in these areas are based on findings in the science of behaviour, and whether his recommendations for social organisation are at all practical. He considers the content of *Walden Two* at some length. The book, which describes a fictional utopian society, was first published in 1948, has sold more a million copies, and has been translated into many languages but not French—apparently on the grounds that the style is not very literary. Richelle argues that we should ignore the style, but study the book to identify the many social policies that Skinner endorsed and believed were supported by the findings of behavioural science. These include: distribution of work such that everyone works only 4 hours each day and thus more people are more productive overall; absence of personal property; avoidance of waste; equality for women; free public broadcasting; community living; absence of aversive practices in education; opportunities for artistic expression; shared care of children; and the absence of jail and psychiatric hospitals (because they are not needed). Richelle explains that Skinner saw all these practices as emerging from well-established behavioural principles and expected that, once established, they would be sustained as cultural practices benefitting the members of the community. Richelle is at pains to point out that Skinner's promoted equality for women significantly before the emergence of the women's movement, and that he seems to have been motivated in part by his distress in seeing the limitations that were encountered by his wife and her female friends. Finally, in this discussion, Richelle takes on the charge that *Walden Two* is not democratic—that it is run by skilled managers appointed on a fixed term basis, rather than by an elected government—and may be fascistic. Here, Richelle agrees with Skinner that Western laisser-faire so-called democracies do not deliver very successful societies because they do not provide an environment conducive to the goodness and wisdom of all, and that the term "fascist" should be reserved for totalitarian regimes that use coercion, and cannot be applied to a society based on positive reinforcement. Richelle concludes that those who apply the term nonetheless are concerned about the apparent loss of freedom by the members of the community in *Walden Two*, and freedom is the main topic in Skinner's other main work in the area, the 1971 book, *Beyond Freedom and Dignity*.

Skinner acknowledged that it was the presence of "beyond" in the title that contributed to the furor following the book's publication, and this was only added at the last minute to the working title, "Freedom and Dignity". I remember that furor well, when Skinner was denounced from both left and right of the political spectrum, so according to the old adage, he must have been doing something right. Richelle starts his account of the book and the debate around it by firmly endorsing Skinner's view that a scientific account of psychology or behaviour can have no place in it for people as free initiating agents. As Richelle says, we should expect every type of scientific psychologist to endorse this position, and Skinner attracted opprobrium for it simply because he made sure that readers knew that he clearly endorsed it. Richelle sees the main purposes of the book to be unpacking the various meanings of the term, "freedom", to reveal some contradictions and debunk some of the myths associated with it, and to warn us of the risks of "uncritical veneration for freedom" (p. 201), while helping people to feel freer nonetheless. This was a substantial agenda for what Richelle terms an "essay", so perhaps it is not surprising that not all readers correctly perceived Skinner's views and objectives.

"Political action is essentially under the control of the next elections, producing a time perspective rarely extending beyond three or four years, when most important issues require long term anticipation and planning."

Skinner saw the ever-increasing threats to human survival of population growth, famine, pollution etc., as directly related to our reluctance to see that these are largely problems of human behaviour alongside the widespread belief that we are "perfectly autonomous beings, acting from sovereign internal initiative" (p. 203). In his main critique of the cultural history of the term "freedom", Skinner suggested that as human societies developed, technologies emerged to protect people from aversive consequences in the outside world, such as attack by predators, but that aversive social controls were in place. In turn, there were movements to free people from these types of social coercion. These were expressed in 18th century philosophies which extolled the virtues of freedom, but extended this to the notion of freedom from all controls, not just aversive ones. Richelle sees this as having two perverse consequences from Skinner's point of view. First, unlimited rights of freedom for one group may lead to constraints for others as may happen in free market economies. Second, according to Skinner we cannot remove all contingencies, but may merely exchange undesirable (e.g., aversive) ones for more desirable ones (e.g., positive reinforcement). Consequently, we may be offered "choices" in

the name of freedom which have undesired outcomes such as drug addiction.

Skinner's analysis of "dignity" is perhaps more a critique of the term, "credit" or "merit". He said that we attribute credit, or dignity, to someone insofar as we are unaware of the reinforcement contingencies maintaining their behaviour. Thus we infer internal positive characteristics from observation of good working habits, rather than account for them by noting the salary or previous training of the person. Richelle sees an analogy here between Skinner's criticism of our use of the language and of freedom and dignity, and his earlier criticism of mentalism in scientific psychology. In both cases, the invention of unobserved and probably fictional causes obstructs progress in our analysis.

A third theme of Be*yond Freedom and Dignity* is the evolution and design of a culture. Skinner believed that if we are to escape catastrophe, and our culture (or another culture) is to survive, we must bring human behaviour under the control of long-term contingencies rather than the prevailing short-term ones. Richelle recognises the practical difficulties that this strategy will encounter, for example in the crucial political sphere: "Political action is essentially under the control of the next elections, producing a time perspective rarely extending beyond three or four years, when most important issues require long term anticipation and planning" (p.214). Richelle acknowledges that Skinner may not have come up with compelling solutions to this type of problem, but does not see anyone else putting forward better ones. There are reasons to be very concerned about this. However, the "Paris agreement" of 2015 gives us hope. A huge majority of countries then agreed in principle to take steps to hold the increase in the global average temperature to well below 2°C above pre-industrial levels, and to increase the ability to adapt to the adverse impacts of climate change and foster climate resilience and low greenhouse-gas emissions development. It may be that the adverse impacts of climate change actually experienced in the last 25 years—and thus providing short-term contingencies—are increasing the effectiveness of some long-term contingencies.

So, what has changed in 20 years since Richelle wrote this thoughtful appraisal? Let us consider some themes Richelle identifies: research on operant conditioning, radical behaviourism in relation to neuroscience and cognition, applications to wider human concerns, and social policy and philosophical issues.

Research on operant conditioning continues! While concern is often expressed about a possible gulf between the experimental analysis of behaviour (EAB) and ABA, EAB is addressing important and fundamental issues. This is not the place to summarise developments, but in recent years there has been progress on long-standing issues about the nature of operant reinforcement, of conditioned reinforcement and their integration with stimulus control. This progress has come about for the good scientific reason that it was realised that more complex experiments must be carried out to resolve uncertainty about long-standing issues. These EAB researches have involved Skinner box experiments, but as Richelle acutely observes, many Skinner box experiments are carried out by those studying learning from cognitive perspectives and by behavioural neuroscientists: Skinner box manufacturers could probably confirm that pharmacology labs are their biggest customers. There is no doubt that this technology is robust and has a "life of its own" which will continue whatever happens in EAB.

The interfaces with cognition and neuroscience continue to provoke vigorous debate. Sadly, this sometimes continues to involve the misrepresentation of Skinner, behaviourism or behaviour analysis. As mentioned above, behavioural neuroscience uses operant techniques extensively, particularly in studies of "memory". Separately, the rapid growth in studies of the neural basis of consciousness has reopened, for some at least, debates about behavioural accounts of consciousness which avoid the pitfalls of Cartesian dualism inherent in a cognitivist approach. These debates involve philosophers and behaviour analysts, psychologists, and neuroscientists. Increasingly, various non-cognitive or "non-representationalist" groups are finding they have common cause in pointing out that they provide a coherent alternative to the confused dualism of cognitivism.

The growth of ABA in the last 25 years has been remarkable, launched by the development of effective functional analysis within behavioural assessment along with Lovaas's dramatic success with intensive intervention in education with children with autism. This growth has brought unanticipated costs as well. While it was very clear in Skinner's writings that he saw behaviour analysis as applicable to all human behaviour, we have now to contend with the view of the wider community that ABA is "a treatment for autism". Instead, we must explain the more complex messages that behaviour analysts have devised a variety of behavioural strategies that have been shown through evidence to be much more effective than any other approaches so far in enhancing the quality of life and attainments of children with autism, and that we have evidence that the same strategies can be effective with many other behavioural problems. Moving towards the wider acceptance of ABA will require more exemplars of substantial studies in other areas that meet our standards of evidence. Behaviour analysts must also recognize that when we offer novel intervention strategies for problems traditionally dealt with by professionals in education, health care, social work, or other fields, there will be many hurdles to overcome before our strategies are widely adopted.

Finally, while the rhetoric of personal freedom, choice and responsibility, still dominates intellectual life in Western countries, and there is little understanding by public intellectuals of the alternative, science-based account of these issues offered by Skinner and subsequent behaviour analysts, public and social policy in those same countries is nonetheless moving incrementally towards those long-term public goals of protecting the wider environment that Skinner promoted. It is possible that these changes will be sufficiently rapid to prevent the predicted environmental disasters that may otherwise engulf us.

profile

Marc Richelle
Professor Emeritus
University of Liège, Beliguim

Interview by Céline Clément, PhD
English Translation: Alix Strickland Frénoy

Those who consider themselves, at varying degrees, followers of Skinner, and who are engaged in modern-day analysis of behavior, credit you to be a key element in bringing the knowledge of Skinner to Europe, particularly in French-speaking areas. The story of your laboratory that was initially for psychopharmacology has already been told in your book, but could you please share it again briefly here? You spent time in Switzerland and at Harvard. During your stays, did you experience any revelations concerning your theoretical approaches or methodologies, and did these experiences reconfirm what you already knew or give you new ways to work ?

To summarize, here are some important points. At the time, spending time in the USA was even more important for young university students than it is today. I was fortunate to receive a scholarship which made it possible for me to go there. After going to the United States, I wanted to expand my training in experimental psychology. The small Department of Experimental Psychology at Harvard University was the perfect place for me to continue my studies. At the time, I was not very familiar with Skinner's work, therefore, it did not influence my choice. I discovered Skinner once I was there. He was at an important stage of his career and I was fascinated by his experimental method, interested by his handmade teaching machines, and receptive to his social philosophy.

When I returned to Liège, where there was an opportunity to develop experimental psychology, I was given the job of Associate Chair of General Psychology within the Department of Philosophy and Literature. It was impossible to install an animal training laboratory within this department at the time. As luck would have it, my friend-

Dr. Marc Richelle

Marc Richelle is Professor Emeritus of the University of Liège where for more than thirty years, from 1962 to 1995, he held the Chair of Experimental Psychology. Both a linguist and a doctor in psychology, trained at the universities of Liège, Geneva, and Harvard, he founded a renowned laboratory in Liège. He has led and directed research in several areas of experimental psychology, including the study of animal learning, behavioral variability and creativity, language psychology and music psychology.

He is the author of several books in French and English, as well as more than 200 scientific articles. Honorary Doctor of the Universities of Lille-Charles de Gaulle, Geneva, Coimbra, Lerida, and Lisbon, he received in 1990 the Five-Year Prize of the National Fund for Scientific Research John Ernest Solvay. He is a member of the Royal Academy of Belgium, and a foreign member of the Academia das Ciencias of Lisbon, and of the Real Academia of the Ciencias Morales y Politicas of Madrid.

Pour celles et ceux qui se considèrent à des degrés divers comme des héritiers de Skinner et qui s'inscrivent dans l'analyse du comportement contemporaine, vous apparaissez comme un élément clé de son essor et de sa reconnaissance en Europe, particulièrement l'Europe Francophone. L'histoire de votre laboratoire qui s'inscrit d'abord en psychopharmacologie a déjà été relatée (Richelle, 1991), mais pouvez-vous la rappeler rapidement ? Elle suit vos séjours en Suisse et à Harvard. Y-a-t-il eu une forme de révélation sur les approches théoriques ou méthodologiques, ou est-ce que cela vous a conforté, ou encore donné des pistes de modes de travail ?

En bref voici les points importants. Tout d'abord un séjour aux USA s'imposait de façon plus impérative encore qu'aujourd'hui aux jeunes universitaires, et j'eus la chance de bénéficier d'une bourse permettant de concrétiser ce projet. Ensuite je souhaitais élargir ma formation en psychologie expérimentale, et mes informations désignaient comme idéal le petit département «Experimental psychology» de Harvard. Mon choix ne fut pas dicté par un intérêt particulier pour Skinner, dont l'œuvre m'était très peu connue. Je découvris Skinner sur place, il était au point culminant de sa carrière; je fus séduit par sa méthode expérimentale, intéressé par ses réalisations artisanales des machines à enseigner, réceptif à sa philosophie sociale.

De retour à Liège, où se présentait une possibilité de développer la psychologie expérimentale, je me trouvais attaché chaire de psychologie générale à l'intérieur de la Faculté de Philosophie et Lettres; il était impensable d'installer un laboratoire de conditionnement animal dans les bâtiments de celle-ci. Les hasards d'une amitié et de l'ouverture d'esprit d'un professeur de pharmacologie me valurent l'hospitalité d'un labo-

ship with a professor in the Department of Pharmacology, as well as his open-mindedness and hospitality, made it possible for me to work in the laboratory of the Department of Medicine of the university. I continued working there for the next 22 years. To show our appreciation to the professor and to the department, our early experiments were dedicated in large part to studying the behavioral effects of psychotropic medication.

In an article which was published in 2006, you describe yourself as a hybrid between Piaget and Skinner. Would you agree with this description today?

Behind this funny description, lies my personal story. Like Piaget and Skinner, the various steps of my training made me unique. Perhaps, I am one of a kind? This did not make me divided in my ideas or lead me to make unnatural conclusions. Since the beginning of psychology, many well-known psychologists have created ambitious, general theories. Often these theories are debated as being unique, or as entirely exclusive of other theories. Most of these theories have contributed to the progress of scientific psychology, but were not effective as general theories.

In hindsight, it seems that these theories are complementary. As I was exposed to these two major theories of the same time period: Piaget's constructive theory and Skinner's radical behaviorism, I never felt the need to choose one and reject the other.

I found it to be more satisfying, while appreciating the differences and oppositions of the two theories, to find the places where the two theories converge. I tried to show these points of similarity in certain texts, some of which are in *Du nouveau sur l'Esprit* (1993) (*Recent Findings in Psychology*) and in a chapter of *B. F. Skinner: A Reappraisal* (1993).

It seems as though many researchers in behavior analysis in France and in French-speaking Canada (Québec), such as Pr. Jean-Claude Darcheville, Pr. Jacques Forget and Pr. Vinca Rivière, are adopting or have adopted, the following idea, in reference to childhood development and childhood learning: The child is, in a way, a «good example» to prove theories about learning in general. What is your opinion? Is this a theory we should continue studying ?

I applaud these researchers. Since the opening of the Rousseau Institute (1912), which has transformed, little by little, into the Department of the Science of Education, everyone who has been trained in Geneva uses the developmental approach.

The developmental approach was central to Piaget's work, to the Rousseau Institute's founder, Edouard Claparède's research, and will always be central to those who follow Piaget, such as Inhelder and André Rey. In this way, the developmental approach (long time ago called the «genetic approach», a term since abandoned due to its ambiguity) is made up of two axes: the systematic study of a child's evolution as he grows up (a study which focuses on the effect of a child's education); and the explicative value of the interpretation of characteristics which are general to humans. The second axis does not seem to have interested Skinner.

Skinner focused in depth on the first axis, not only to construct his theory of development, but also, in the interest of education, to reveal the laws of learning, on which the educational system had focused very little. I must add that a team

ratoire de la Faculté de médecine, qui dura 22 ans. Que nos premières recherches aient été consacrées, pour une grande part, à l›étude des effets comportementaux des psychotropes était une forme de gratitude envers le collègue qui m'hébergeait.

Dans un article de 2006 (Richelle et al., 2006), vous êtes décrit comme un hybride entre Piaget et Skinner. Cette vision est-elle toujours d'actualité ?

Derrière cette boutade –plutôt qu'une vision – se trouve simplement mon histoire singulière. Les cheminements de ma formation on fait de moi psychologue qui fut l'élève de Piaget et de Skinner – un cas rare. Peut-être unique? Cela ne m'a pas rendu schizophrène, ni ne m'a entraîné dans des idées contre nature. Beaucoup des grands maîtres qui ont modelé la psychologie de puis ses débuts ont élaboré des théories ambitieuses, générales, qui se sont souvent affrontées dans des débats où elles se présentaient comme exclusives les unes des autres. La plupart de ces théories ont contribué aux progrès de la psychologie scientifique, mais ne se sont pas imposées dans leur ambition généraliste. Avec le recul du temps, elles apparaissent comme complémentaires. Exposé directement à deux théories majeures de la même époque, le constructivisme piagétien et le behaviorisme radical de Skinner, je n'ai jamais ressenti le besoin d'en choisir une et de rejeter l'autre. J'ai trouvé plus satisfaisant, tout en reconnaissant leurs différences et oppositions, d›en repérer les convergences. C›est à quoi je me suis employé dans quelques textes, certains repris dans le recueil d›articles *Du nouveau sur l'Esprit?* En 1993 et dans un chapitre de *B.F.Skinner: a reappraisal* (1993)

Il semble que plusieurs des chercheurs en analyse du comportement en France ou au Canada Francophone (province du Québec), par exemple les Pr. Jean-Claude Darcheville, Jacques Forget, Vinca Rivière s'inscrivent ou se sont inscrits dans une mouvance avec un intérêt spécifique pour le développement et les apprentissages chez l'enfant, avec l'idée que l'enfant est en quelque sorte un « bon modèle » pour éprouver des hypothèses sur les apprentissages en général. Qu'en pensez-vous ? Est-ce une voie que nous devrions toujours explorer ?

Je ne puis qu'applaudir au choix de ces chercheurs. L'approche développementale colle à la peau de tout qui a été formé à Genève, depuis les origines de l'Institut Rousseau (1912) peu à peu transformé en Faculté de Psychologie et Sciences de l'éducation. Elle est centrale dans les travaux de Piaget, elle l'était déjà chez le fondateur Edouard Claparède, le restera chez tous ses successeurs, piagétiens – telle Inhelder - ou non tel André Rey. Dans cette tradition, l'approche développementale (longtemps appelée «génétique», terme ambigu peu à peu abandonné) comporte deux axes: d'une part l'étude systématique de l'enfant à travers son évolution au fil de sa croissance (étude qui s›impose à l›évidence dans le domaine de l›éducation); d›autre part, la valeur explicative de cette étude dans l'interprétation des caractéristiques des conduites humaines en général. Ce second axe ne semble pas avoir intéressé Skinner. Il s'est beaucoup occupé du premier, non tant pour construire une théorie de développement, mais pour mettre en œuvre à des fins éducatives les lois de l'apprentissage dont les systèmes d'enseignement scolaire ne se ont guère préoccupé.

Je dois signaler qu'une équipe de mon laboratoire

in my laboratory worked on development between the 1960s and the 1980s. The team conducted classic Piaget experiments (classification, seriation), modified so as to see if very progressive learning — hypothetically "errorless teaching" — would favor learning.

This work remains relatively unknown, due to curious circumstances related to the context of the research. This research was generously financed by the Belgian Ministry of Education. The results of the research were published in book form, featuring numerous color illustrations of the materials that had been presented to the children and edited by the Minister. In the end, they were not made available to the public. All of the work was in French, conformed to the rules set forth by the Ministry of Education and approved, without reserve, by the researchers.

I mentioned the developmental approach because, in addition to your research with Helga Lejeune, which was particularly interesting with regard to inter-species comparisons, you edited and re-edited a very important work about the acquisition of language in children (Moreau and Richelle, 1981). In your opinion, does Skinner's work, in particular,* Verbal Behavior*, remain largely unknown? Will applied behavior analysis, finally, shed light on Skinner's thoughts from this point of view?

My entry into the development of language and psycholinguistics requires more information about my personal journey. I was at Harvard during 1958–1959. I dedicated myself to reading Skinner's classic works, and waited until later to study *Verbal Behavior* which had just been published.

I had only had indirect contact with this publication: a fellow student gave me a copy of an exam that was based on Chomsky's review of *Verbal Behavior*. Chomsky's critique was very well received by the psychologists of the time.

I read Chomsky's critique with great interest. My linguistic knowledge, the result of my university studies, allowed me to admit the specificity of human language as opposed to an extension of animal language. Language is what we consider to be the major distinctive trait of our species. I read *Syntactic Structure*, before approaching *Verbal Behavior*, after my return. I was teaching the psychology of language, in the 1960s, in Liège and in Geneva. I immersed myself in the already abundant literature, and carefully read *Verbal Behavior*, as well as Chomsky's review of it. This time the review seemed to me to be inaccurate and deceptive, citing ideas and opinions that B. F. Skinner had not had. In the midst of it all, I wrote an article to point out and discuss the errors in the review, which could have also been intellectual dishonesty. The article was published in French, then translated into English in the USA, and into Spanish in Barcelona. It was followed by my book *Acquisition du Langage* (*The Acquisition of Language*), (1972), motivated in part by my desire to pop the Chomsky bubble. Ten years later, a colleague of mine, Marie-Louise Moreau (who had participated in the seminar about Chomsky held in my animal conditioning laboratory) suggested I update my little book from 1972. She was right, the domain had expanded impressively in the past 10 years. She took on the majority of the publishing work. The developmental psycholinguists had overcome the obstacles put in place, and maintained, by Chomsky. The 1972 Chomsky debate was no longer

a travaillé dans les années 60-80 sur le développement. Elle avait repris des épreuves classiques de Piaget (classification, sériation) en les aménageant de façon à voir si un apprentissage très progressif – hypothétiquement «sans erreurs»- favoriserait la maîtrise des opérations en cause. Ces travaux sont restés méconnus, pour des raisons assez curieuses relevant du contexte de la recherche. Celle-ci était généreusement financée par le Ministère belge de l'éducation. Les résultats furent publiés sous forme de livres, comportant de nombreuses illustrations en couleur du matériel présenté aux enfants, édités par le Ministère, qui ne se préoccupait pas de leur diffusion. Tout était en français, conformément aux règles ministérielles, approuvées sans réserves par les chercheuses.

J'évoquais l'approche développementale car au-delà de vos recherches particulièrement fructueuses sur les comparaisons inter-espèces avec Helga Lejeune en particulier , vous avez réédité à plusieurs reprises un ouvrage très important sur l'acquisition du langage chez l'enfant (Moreau et Richelle, 1981). Selon vous les travaux de Skinner, en particulier Verbal Behavior, sont-ils encore trop méconnus ? L'analyse appliquée va-t-elle finalement éclairer la pensée skinnérienne de ce point de vue ?

Mon incursion dans le développement du langage et dans la psycholinguistique demande quelques éclaircissements sur mon parcours personnel. J'étais à Harvard en 1958-59. Je me consacrai d'abord à la lecture des ouvrages classiques de Skinner et laissé pour plus tard Verbal Behavior qui venait de sortir de presse (1957). Je n'eus avec cet ouvrage qu'un contact indirect: un condisciple me passa une copie sur épreuve de la critique de Chomsky, qui devait valoir à ce linguiste l'engouement des psychologues. Je lus ce texte avec intérêt, avec l'arrière plan de mes connaissances en linguistique acquises lors de ma première formation universitaire, qui me portait à admettre la spécificité du langage humain et à tenir pour peu vraisemblable l'extension de modèles animaux à ce qui nous apparaît comme le trait distinctif majeur de notre espèce. Je lus *Syntactic Structure,* avant d'aborder *Verbal Behavior*, après mon retour. Je me trouvai impliqué dans les années 1960 dans des enseignements en psychologie du langage, à Liège et à Genève. Je m'immergeai dans la littérature déjà abondante, repris attentivement VB et la critique de Chomsky, dont l'argumentation me parut cette fois tout à fait spécieuse, prêtant à BFS des idées qu'il n'avait pas. J'écrivis dans la foulée un article pour relever et discuter ses erreurs, qui pourraient être aussi bien des malhonnêtetés intellectuelles (Richelle, 1972a). Publié en français à Paris, puis traduit en anglais aux USA et en espagnol à Barcelone, repris dans le volume de 1993. Suivit mon *Acquisition du langage, (*1972b*)* motivé entre autre par le souci de dégonfler la bulle chomskienne. Une dizaine d'années plus tard, une collègue, Marie-Louise Moreau (qui avait participé au séminaire sur Chomsky tenu dans mon laboratoire de conditionnement animal – voir mon texte autobiographique) me suggéra de mettre à jour mon petit livre de 1972. Elle avait raison, le champ avait en 10 ans pris une ampleur impressionnante. Elle se chargea de l'essentiel du travail. Les psycholinguistes développementalistes avaient dépassé les impasses où Chomsky les avaient pour un temps enfermés. Le débat en cours en 1972 pouvait passer dans l'histoire (l'édition que vous citez est une 5ème édition de 1997).

relevant.

Some people think it is a shame to focus on applied behavior analysis, particularly in reference to autism, to the detriment of theoretical research (and related training programs). What is your opinion?

I have never been in favor of the distinction between theoretical research and practical research, or hands-on application. Each feeds the other reciprocally. Laboratory researchers remain blind to the practical work of their colleagues, to their detriment. However, the latter will not always find the answers to their questions from the former. This way of thinking is relevant in the field of psychology, as well as other sciences. With regard to autism, I do not have the competency to share an opinion.

You published a work titled Du Nouveau sur L'esprit (1993) (Recent Findings in Psychology) that is a collection of articles published between 1970 and 1991. Within this work, you refer to your fears and hopes for the year 2000. Among other subjects, you referenced the importance of focusing on the obstacles facing these theories, rather than the difficulties they surmounted. In your opinion, is it necessary in a dialectic movement, to emphasize the problem, rather than the theoretic model? What do you think now, more than 20 years later? Have we reached this goal?

I don't think this is a question than can ever be fully answered for everyone. It involves the mentality of scientists, some oriented towards facts, and others citing what they call *theories*. We need to live with that. It is positive as well.

Finally, in your opinion, what is the greatest misunderstaning concerning Skinner's work?

There are multiple misunderstandings. What is the greatest? That depends on which aspect of the work we are considering. Simply put, it is necessary to focus on two types of misunderstandings. The first concerns the psychological theory in the strictest sense of the term: the acceptance of a more radical behaviorism than that of Watson, which is a point of view that is not discussed in any of Skinner's texts. The second concerns social philosophy: it creates an image of Skinner as someone who defends despotic authoritarianism favoring coersive practices which manipulate social life. Nothing could be further from the truth regarding the contents of *Walden Two*, as well as his many essays, such as *Beyond Freedom and Dignity*.

Certains d'entre nous regrettent parfois la mise en avant de l'ABA, en particulier en autisme, au détriment de l'AEC et de la richesse des laboratoires. Qu'en pensez-vous ?

Je n'ai jamais été très favorable à la distinction entre recherche fondamentale et applications. L'une se nourrit de l'autre et réciproquement. S'il advient que les gens de laboratoire restent aveugles à ce que font leurs collègues praticiens, tan pis pour eux. Mais ces derniers ne trouvent pas toujours chez les premiers de quoi résoudre leurs questions. Cette façon de voir vaut pour les autres domaines de la psychologie, comme des autres sciences. Sur le cas particulier de l'autisme, je ne me prononce pas, n'ayant pas la compétence.

Vous avez publié un ouvrage intitulé Du nouveau sur l'esprit (1993) qui est un recueil d'articles publiés entre 1970 et 1991. Vous y évoquiez vos craintes et espérances pour l'an 2000. Entre autres il s'agissait, pour aller de l'avant, de mettre en évidence les difficultés auxquelles les théories se heurtaient, plutôt que les difficultés qu'elles avaient surmontées ? Selon vous il fallait dans un mouvement dialectique, mettre l'accent sur le problème, plutôt que sur le modèle théorique. Qu'en pensez-vous plus de 20 ans après ? Y sommes-nous parvenus ?

Je ne crois pas que ce soit une question qui puisse jamais être résolue une fois pour toute. Elle relève de la tournure d'esprit des scientifiques, les un orientés vers les faits, les autres vers ce qu'il convient aujourd'hui d'appeler les *modèles*. Il nous faut vivre avec çà. Et c'est bien ainsi.

Pour conclure, quel est selon vous le plus grand malentendu sur l'œuvre de Skinner ?

Les malentendus sont multiples. Quel est le plus grand? Cela dépend de l'aspect de l'œuvre que l'on considère. Pour faire simple, il faut mettre l'accent sur deux types de malentendus. L'un porte sur la théorie psychologique au sens strict: l'assimilation à un behaviorisme plus forcené («radical») que celui de Watson, or c'est une vue qui ne s'appuie sur aucun texte de BFS. L'autre porte sur la philosophie sociale; elle fait de Skinner une sorte de défenseur de l'autoritarisme despotique partisan des pratiques coercitives pour gérer la vie sociale, or rien de plus étranger à la substance aussi bien de *Walden Two* que des nombreux essais, dont *Beyond Freedom and Dignity*.

About the Interviewer:

Dr. Céline Clément is professor of psychology at the Université de Strasbourg in France. She received her PhD in developmental psychology from the Université Charles de Gaulle in Lille, France (Supervisor Pr. Jean-Claude Darcheville).

Throughout her academic career, mainly at the Université de Strasbourg, she has been a visiting professor at the Université du Québec à Montréal (Canada) in the Prof. Jacques Forget team (Applied Behavioral Sciences Laboratory). She conducts research in educational psychology. In the Department of Education at her universtiy, she is interested in applied behavior analysis in school settings, inclusion of children with neurodevelopmental disorders in primary and secondary school, and school management. She also has an active research program in parent training programs for children with autism spectrum disorders.

profile

Per Holth

Oslo and Akershus University College
Oslo, Norway

Interview by Sheila Habarad

Dr. Per Holth is a Professor of Behavior Analysis at Oslo and Akershus University College. His current research interests include verbal behavior, joint attention, establishment of conditioned reinforcers, contingency management treatment of drug abuse, and the implementation of evidence-based practices. He has written for peer-reviewed publications on basic research, applied work, and philosophy of science. Dr. Holth is a member of the B. F. Skinner Foundation's Board of Directors.

How did you get involved with the chimpanzees and giraffes at the zoo?

We had a rat lab at the university for quite some time, but at one point it became clear that we might lose it. We needed other options for students to study animal behavior. Then one afternoon I walked through my living room where the TV was working. The show about the chimps was on, and I stopped to watch. It turned out that the chimps were from a Norwegian zoo, and the animal keeper said it was a constant challenge to find interesting tasks for the chimps. A day in the zoo can be really boring for the chimps if there is nothing to do. I thought I could help the zoo to design challenging activities for the animals, which, in turn, could open the doors of research possibilities for us. I went ahead and gave the zoo a call, and the relationship started. Before I designed any interventions, I took a trip to the United States to visit a friend, Jesús Rosales, in Dallas. Together, we visited the zoos where he has worked. Jesús showed me videos of different interventions that researchers implemented, specifically enrichment activities. Back in Norway, I went to work. I have been interested in collaboration, so that has been one skill that I have been trying to teach the zoo chimps to do. I have been teaching them separately to press one lever to receive a bit of a smoothie, and then two levers simultaneously. Slowly, we have been moving the two levers farther and farther apart so at some point when they aren't able to push both of the levers at the same time, they will have to recruit another chimp to help them, demonstrating collaboration.

How long has it taken chimps to start collaborating?

Well, actually out of twelve chimps only two have figured it out in the sense that they actually press both levers when they are alone in the room. When two chimps effectively collaborate and press both levels at the same time they receive a large amount of smoothie. Most go and sit pressing one lever. When two levers are pressed, both chimps receive the juice anyway, so it's just intermittent reinforcement without being sensitive to what's happening on the second lever. But the two that figured it out, the alpha male and his son, are actually the best so far. They go right in, press one lever—and the smoothie doesn't come out. Then they press both levers and receive huge amounts of smoothie out of both dispensers. We ran into a problem as we moved both levers apart. For technical reasons, we could not move them sufficiently apart from each other to get to the final test point. We have to rebuild the whole rig in order for the chimps to reach the final test point. There is also another challenge. The chimps are not very eager to go inside one-by-one or in pairs. They usually go together, otherwise the alpha male can get really crazy — he needs to keep track of everyone. It is difficult to make the arrangements to get a collaborator to work as a reinforcer for a specific behavior.

So when you say they come in this lab, can they come in whenever they want?

They get access to the lab when the animal keepers open the door, but they can hear the sounds from the preparations before opening time. When they hear these sounds, they usually line up outside of the door.

So they are not put in the room, they volunteer to go in the room?

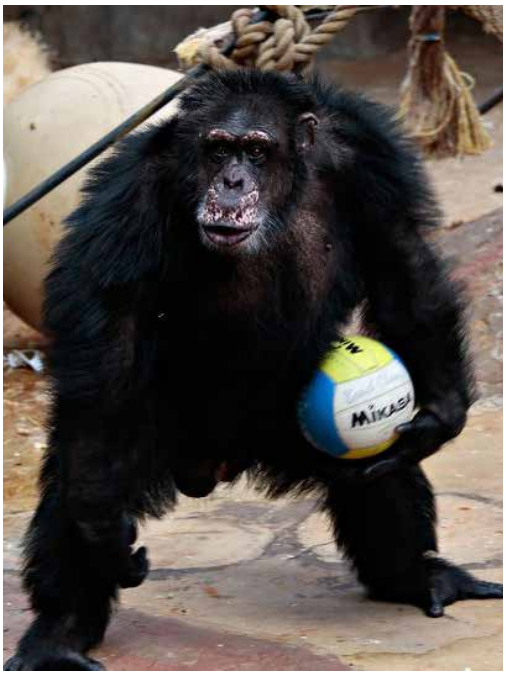
Oh yes, always! They will stay by the door when they hear the wonderful sounds of the dispensers being filled up. And then come running in when the door opens.

Do they wait in line patiently?

Chimps are never patient.

How long did it take for the alpha male and his son to learn how to collaborate?

They learned through many small steps. It was most surprising to me how long it took to get them to press the lever in the first place. When you are used to a rat lab, they are deprived of water for about 22 hours before each session. You do the magazine training over the first few days, which is like clicker training. You make sure there is sound from the magazine that works as a conditioned reinforcer for behavior. Then you can shape up lever pressing and other types of behavior in usually just a few minutes, about 5-10 minutes, and most of the rats will be pressing the lever under those conditions. I thought chimps are so much smarter than rats so this should go really fast when they start getting the smoothie. But actually, I had to run many sessions to get the chimps to start pressing levers. And the alpha male and his son were not among the first to start pressing levers. There were two female chimps who were really quick to learn. But that alpha male, Julius, was just sitting there receiving the smoothie while someone else was pressing the lever. I've seen the same thing with rats: If you put two rats in a box, one rat will be doing the work, while the other enjoys the pellets.



Julius (born 26 December 1979) is a chimpanzee at Kristiansand Zoo and Amusement Park in Norway. As a baby, Julius was rejected by his mother, and was eventually adopted by the family of Edvard Moseid, the director of the zoo. The baby chimpanzee became the subject of a children's documentary on the Norwegian Broadcasting Corporation in 1981, and was soon the park's most popular attraction.

As Julius grew older and became more aggressive, attempts were made to reintegrate him with the flock. First attempts were unsuccessful, and Julius had to be isolated. In 2005, the leader of the zoo's chimpanzee group died and Julius was once more admitted with the others, this time taking over leadership of the group.

Do you have videos of those sessions?

Yes, I have videotapes of every session. I have hundreds of hours at this point. It is really funny. They do really strange things during the session.

How do the chimps know when the sessions end?

There is a special tune that plays throughout each session. It is a tune that is quite famous in Norway. The song is about Julius the chimp. When the tune stops, it signals the end of the session. They leave very soon after the tune.

Is there a way to measure whether the chimps became happier after doing these activities?

I don't know about that, but I would say that they look happy when they come running to the sessions.

How frequent are the sessions?

Over long periods it's been every day. Now, it's been less frequent due to a problem with the lights. It would be ideal for the sessions to be daily, and to control who is coming in, but I cannot control all aspects of the environment.

How long does the session last?

About 20 minutes, that's the maximum. There is another limit. If they reach a certain number of reinforcements the dispensers will be empty. So either 20 minutes or when a particular number of reinforcers have been delivered. And they can press the levers so quickly and get so much smoothie out of there, sometimes the session will end in about 15 minutes.

And what about giraffes?

The background on the giraffe story is that I discovered, quite by accident, that giraffes have really long tongues. That's what I found out when visiting a safari park in Denmark. We had a sunroof in the car that we left open in the giraffe area, which was a mistake. We had a nectarine between my wife and me. The giraffe's tongue came down and the nectarine was gone. When that happened I thought we could do something with those tongues, tongue behavior. The animal keeper said they needed special tongue exercise because they don't use them as they would normally do under natural conditions. So we made special equipment where they had to put their tongue into a hole in a large box and operate a wood switch to one of the sides. And that operates a trigger, so a certain number of food pellets drop into a box just below the operandum. There is a red light on the box to indicate that reinforcement is available, the light becomes established as a discriminative stimulus. Whenever the red light is on, the giraffes will come and operate the switch. We also have moved the switch farther in the hole. When the giraffes started it was easy for them to reach, but now they really have to stretch their tongues to operate the tongue lever and receive the food. And of course, in that situation we have four giraffes working at the same time. Three of them can circulate to use their tongue and everybody gets to eat from the tray. There is one smaller giraffe who can't quite stretch up to the lever so he's just receiving the food.

Now we want to have at least two of the boxes placed outside, and replace the red light with a sound as the discriminative stimulus. Giraffes tend to stay quite close to their stable. They are ready to go inside whenever they are able, but they have a large safari area. These devices will help them walk around their area more. Then when they operate the lever with their tongues they can either get the food or activate the sound from the other apparatus. Once the giraffes arrive at the apparatus that made the sound and move the lever with their tongue, they will either receive food or activate another device, setting off sound. That will result in a lot more activity, which is better for the giraffes and the visitors.

This is the exact same idea that we have for the tigers.

We are starting right now with a new meat dispenser for the tigers. It is the same type of lever that the chimps use, but it is attached to a meat dispenser. We would like to have two of those in the outdoor area in an effort to get tigers to hunt. It is really boring to see a tiger lying around, and a tiger really does lay there all day except when fed, which only happens once a day.

Would you introduce collaboration techniques similar to the chimps with the tigers?

I guess we could get the tigers to collaborate. Elephants can collaborate effectively; pull each end of the rope together to get something. It might be a bit more difficult with the giraffes or tigers but it boils down to establishing the behavior of one of them as the SD for the behavior of the other one. I think we could do it.

I'm curious as to how your relationship with the zoo works. If you have this idea to get giraffes to collaborate—do you go to the zoo and say "We want to try this," or do you wait for them to come to you with a problem?

It works both ways. Most of the experiments are ideas I've come to them with. But they've had problems of their own when they've asked for help. One of the giraffes had an eye infection that all giraffes catch very easily because they get into all sorts of food. The zoo has to put the giraffe temporarily to sleep if the infection gets very serious. That can be very dangerous for giraffes, they die in high rates when they are put down in that manner. They actually had a death of a giraffe recently in similar circumstances — a giraffe drowned in its stomach contents when it was put down. Giraffes can also hurt themselves badly when they fall after the anesthesia. Instead of putting this one giraffe to sleep, one of my students ran a desensitization procedure with the goal to spray antibiotics into the eyes. Initially, giraffes do not take that easily. But if you come with your carrots and sweet potatoes and everytime you get close to the face they eventually learn the good stuff will follow the spray. Overtime they will come so close that your hands will be near if not touching their faces. As long as the giraffes see that the carrots keep coming, we can eventually start spraying a little bit. It only took just a few days before we were able to spray the antibiotic on the giraffe's eye. The zoo's problem is that the animal keepers do not have time for this type of training. When our students go out there, we are able to collaborate and solve those problems effectively.

Is this a unique relationship between the university and the zoo, or is this fairly common?

I think it is fairly common, and there are some very good examples from other places. Actually, one of the examples I looked into was Gary Priest, an American who worked in many zoos for several years. He solved many serious problems. He worked with a mandarin, a huge monkey, with diabetes. This monkey would have died if he didn't get his medication. And of course, they can't put him to sleep every day to give him a shot. Through a very nice desensitization procedure, where the mandarin: 1. Sticks his arm into special equipment, 2. Holds onto a bar, 3. Gets a shot of insulin, 4. Receives his reinforcers, there was no difficulty at all. I think the procedure could have been even more effective if you had a switch he could have grabbed onto so he could produce something directly. This would also allow you to stretch the time that was necessary for the monkey to hold in order to receive the reinforcer. It may not necessarily have been more effective than the procedure shown in the video, but less time consuming because it could be automated. That's one of the things I am trying to do, to automate most of the procedures so that the only thing the staff have to do is to start the computer. It does take away some interactions between the animal keeper and the animal, but they use some of the same types of procedures when they have the time for it.

There is an extensive discussion in the literature, especially at the experimental level, with respect to behavioral variability. How do you assess within behavior analysis the origins of variation and novel behavior?

That's a huge question because there are different views on this of course. I think Allen Neuringer has done very useful experiments in the area. I'm not sure I agree with his conclusions that variability is an operant on its own. But he has shown very clearly how you can produce and increase variability through certain kinds of schedules of reinforcement and that's the most important thing. Variability is extremely important, both for theoretical reasons and practical reasons. For theoretical reasons, without variability there could be no effective evolution through selection, no effective operant evolution either, and no operant development without the continued source of variability. Selection could only restrict the repertoire within what's already present. A continued source of variability in behavior is extremely important for that reason.

And it's important for practical matters. You'll always aim to establish more than what's directly taught. And some of us teach children with autism, in which a lack of behavioral variability is a problem by itself. And I think there is sufficient research to suggest the kinds of schedules that Neuringer and his colleagues have studied a lot, the lag schedules of reinforcement, can also be used to get more variability in children with stereotypic behavior problems.

The issue of whether variability should be considered as an operant on its own is a lot more difficult to answer. Actually, during my flight from Norway to Boston I was thinking about this problem and the *Learning* text by Charlie Catania. He mentioned three criteria: First, behavior has consequences, second, the rate of responding increases, and third, the rate increases because of the relation between behavior and the consequences. I think it's that 3rd criterion that lacks sufficient support in order to say for sure it's useful to consider variability as an operant on it's own. There's no question you can arrange consequences contingent upon behavioral variability, that's exactly what you do in those kinds of experiments with the lag schedules. The second criterion is also evident. You do get more variability under those circumstances. But the third criterion, whether that increase in variability is the direct result of that contingency — I don't think so. I think there is something that you get automatically perhaps from those lag schedules, which is a pendulum effect between reinforcement and extinction. You need to have sufficient reinforcement to keep responding going. But it's actually during extinction where you see variability. If you just put behavior on extinction you'll lose it within a certain period of time. Extinction is

not a good way to get much variability. But if you can switch between extinction and reinforcement the way the lag schedule is designed, you'll see variability. This is a finding that you'll see across many different experiments. I remember my first experiment in the rat lab. I, like many others, gave too many reinforcers away for free during shaping. There is a little organism there, you think deserves a pellet or another drop of water. But if you are too generous you will not get anywhere – you will just continue to shape the "almost pressing" behavior. It was my teacher Terje Sagvolden who said, "No Per, you have to first frustrate the rat!" That was his way of saying "You start extinction." The rat is not getting more unless he's doing more than he did before. Don't reinforce every response, gradually increase the criterion and you'll see some changes in behavior. That's what I did. Just don't deliver the reinforcer, do a little extinction and you'll see behavior variability increase almost immediately.

One of my friends, Iver Iverson, did some very nice experiments with rats that showed this in detail. He had some rats taking photos of themselves every time they pressed a lever. The rats were basically taking selfies. He put a pole from a ceiling attached to a switch, every time the rat pressed the pole it would hit the switch, which would then take the picture. From those pictures you would see exactly the topography of the rat's behavior at the moment the press occurred. After shaping, continuous reinforcement goes on for some time. You'll see each rat end up with a very characteristic way of pressing that pole lever, so one rat will behave in a particular way every time. When you see a sequence of that rat's pictures it looks like copies of the same picture with very minimal changes. But its actually a series of different photographs. Another rat could engage in another behavior while a third rat can have a different approach but again, the pictures will have very minimal changes across the series of photographs across the continuous reinforcement period.

There is not much variability coming out of consistent reinforcement. When the extinction starts, there will be one response similar to others because it is still too soon after receiving the reinforcement, but you'll see the variability start almost immediately. Once the variability starts, there will be all different topographies from then on during the extinction period. If this goes on for a long period of time, the rat will stop pressing the lever all together. But when continuous reinforcement is reintroduced, the rat will go back to the exact same topography displayed prior to the extinction period. The behavior remains consistent.

Another important phenomenon is this: The conditions prevailing at the time of reinforcement can be established as S-deltas for continued responding, as it is during fixed intervals and even in the fixed ratios, you'll typically see that break shortly after reinforcement. There is never another reinforcement shortly after one has been delivered so there will be a low rate of responding at that time. That of course can happen in lag schedules too. There is no reason to repeat the same response again if it is never reinforced a second time shortly after reinforcement. There are several well-known behavioral facts that are sufficient to explain, I think, the kind of varability that you see during lag schedules of reinforcement, but what really convinced me was an experiment we did in our rat lab. We started with regular reinforcement and then moved on to lag 1, which means that in order to get the reinforcer that rat had to do something different than the previous time. But instead of having the rats press a sequence on levers we had the rats produce a number of different response topographies. We provided a number of different operando, a left lever, a right lever, a chain hanging from the ceiling, a photo cell that a rat could poke its nose into, and a wood lever constructed for this purpose. During a lag 1 schedule the rat had to produce a different response in order to produce reinforcement. If the rat had pressed the left lever previously, during lag 1 it could press the right lever or pull the chain to access reinforcement. But in this particular experiment we increased up to lag 3. When we did that very gradually, rats would start doing a higher order of stereotypy. They would go from one response to the next to the third and the fourth always meeting the lag 3 criteria by doing 4 different responses. Then we put in one new device. When they had operated the 4 previous devices, extinction started because we raised the criteria to lag 4 making them go to a 5th response. When that accidentally happened, that they probed the new chain, the rats went over and drank the water and then went straight back to the lag chain. So what was reinforced was the particular response prior to the delivery of the reinforcer. We didn't get reinforcement of variability, at that point we got reinforcement of the response that occurred just prior to the reinforcer. We saw that happen for four different rats and it happens again when you put another response in there. We had no reason to say that we had reinforced variability directly. But of course we did get large variability after when we increased from lag 3 to lag 4 with those rats, what we could call higher order stereotypy.

But stereotypy is just a stupid name because they were just very good at what they were doing. Stereotypy sounds like something negative. I mean the pilots up there flying in the sky, they better be rather stereotypic in their behavior. I wouldn't appreciate much variability. It's important that things are done as they should be. Variability isn't always very good.

But the point was that when we increased from lag 3 to lag 4 we saw no more of that stereotypic behavior and the whole thing broke down. That's when what we saw was very similar to what Neuringer discussed, which is more or less random responding. What we got in the lag 3 requirements is what they talk about as memory based variability, where the responses at any time seem to be controlled by the previous responses.. But that broke down, as it does for the pigeons when they have to peck a sequence of eight pecks onto keys and they have their own lag schedules up to lag 50. It's of course impossible for the pigeons to remember the last 50 responses so it is just a random reinforcement of many different responses. One has to make sure that behavior is reinforced sufficiently and frequently to maintain the responding, but beyond that any kind of strange arrangement that is more or less random would produce variable behavior.

report

First Brazilian Championship of Rats' Basketball

Helder Lima Gusso

Translated by Bruna Colombo dos Santos

Michael Jordan, Kobe Bryant, Stephen Curry and Fred Keller are some of the biggest names in basketball history. Fred Keller? Yes. In 2011, Fred Keller was the winner of the First Brazilian Championship in Rats' Basketball in Curitiba, Brazil. The animal's name was a tribute to illustrious professor Fred Simmons Keller, who brought behavior analysis to Brazil. This event got the media's attention, attracting the main TV channels, radio, and newspapers to the University. The fun aspect of the activity was highlighted in the reports. On a few occasions we had the opportunity to present the motives and objectives that led us to do the championship.

At Positivo University (Universidade Positivo), the psychology undergraduates did two years of basic studies in behavior analysis before starting the specialization in practical fields (therapy, OBM, education or social). In the basic training the professors involved (Helder Lima Gusso, Bruno Angelo Strapasson and Fernanda Gutierrez Magalhães) identified learning concepts and fundamentals of the approach, but the development of a repertoire of identification and management of reinforcement contingencies in applied situations was needed. To address this, they started examining complementary activities to improve the formation of students interested in behavior analysis.

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Michael Jordan, Kobe Bryant, Stephen Curry e Fred Keller são alguns dos maiores nomes na história do basquete mundial. *Fred Keller?* Sim... esse era o nome do rato campeão do I Campeonato Brasileiro de Basquete de Ratos em Curitiba-Brasil, em 2011. O nome do rato, obviamente, era uma homenagem ao ilustre professor Fred Simmons Keller, que trouxe a Análise do Comportamento ao Brasil. A realização desse evento chamou atenção da mídia, atraindo os principais canais de TV, rádio e jornais à Universidade. Em geral, o que era destacado nas reportagens foi o aspecto lúdico e divertido da atividade. Em poucas ocasiões tivemos a oportunidade de apresentar os motivos e objetivos que nos levaram à realizar o campeonato.

Na Universidade Positivo, instituição na qual ocorreu a atividade, os alunos de graduação em psicologia cursavam dois anos de formação básica em Análise do Comportamento, antes de iniciar formação específica em campos de atuação (clínica, OBM, educação ou social). Na formação básica os professores envolvidos (Helder Lima Gusso, Bruno Angelo Strapasson e Fernanda Gutierrez Magalhães) identificavam a aprendizagem de conceitos e fundamentos da abordagem, mas baixo desenvolvimento de repertório de identificação e manejo das contingências de reforçamento em situações aplicadas. Nesse sentido, iniciaram exame de alternativas complementares para melhorar a formação dos alunos

The opportunity to do this was presented by the Experimental Analysis of Behavior Laboratory. We believed that few opportunities taught reinforcement contingencies management and the art of shaping behavior, as well as activities with a Skinner box. Besides this, we had experimental laboratory activities for only one semester, keeping the didactical laboratory idle the second semester of each year. We decided to increase the use of the university laboratory, with a complementary activity that was optional for the students interested in improving their skills. We wanted to challenge students to teach more complex behavior than lever pressing, and our intention was to develop the subtle art of shaping behavior.

We searched for models of how to do this, and we found inspiration in a YouTube video. We saw the behavioral work developed by Dr. Alliston Reid at Wofford College, which challenged his students to teach rats to play basketball. We thought about how to adapt the proposal to soccer, Brazil's national passion, but we considered that the response topography in basketball would be much more interesting and challenging for our educational objectives.

The project involved an ethical dimension. We used animals from classes in the didactic laboratory in a previous semester in Skinner boxes' activities. The hypothesis was that the animals, after new training in basketball, would be seen as "members" of the psychology course, and would be used in school presentations, in which psychology students would teach children about basic

principles of behavior. This would encourage avoidance of euthanasia of the healthy adult animals. The project was approved by the Ethical Committee in Using Animals at the University.

interessados em Análise do Comportamento.

A oportunidade já existente de formação nisso no curso eram as atividades didáticas no laboratório de Análise Experimental do Comportamento. Em nosso exame, acreditávamos que poucas oportunidades ensinam tanto sobre o manejo de contingências de reforço e a arte da modelagem de comportamentos quanto as atividades em uma caixa de Skinner. Além disso, tínhamos atividades no laboratório experimental durante apenas um semestre, mantendo o laboratório didático ocioso no segundo semestre de cada ano. Diante de tudo isso, decidimos potencializar o uso do laboratório didático da universidade, por meio de atividade complementar facultativa aos alunos interessados em aperfeiçoar sua formação. A única certeza que tínhamos era que gostaríamos de desafiar os alunos a ensinar comportamentos mais complexos do que pressionar a barra.

Visávamos com isso desenvolver a sutil arte de modelar comportamentos.

Buscamos modelos de como viabilizar isso e encontramos inspiração em um vídeo no youtube. Vimos o trabalho desenvolvido pelo Dr. Alliston Reid no Wofford College que desafiou seus alunos a ensinar os ratos a jogar basquete. Pensamos em adaptar a proposta para o futebol, paixão nacional no Brasil, mas consideramos que a topografia de resposta do basquete seria mais interessante e desafiadora para nossos objetivos educacionais.

O projeto envolveu uma dimensão ética importante. Utilizamos os mesmos animais que participaram das aulas no laboratório didático no semestre anterior nas atividades nas caixas de Skinner. A proposta era que esses animais, após o novo treinamento em basquete, passassem a ser vistos como "membros" do curso de psicologia, sendo utilizados em apresentações em escolas, nas quais os alunos do curso ensinariam crianças sobre os princípios básicos do comportamento. Isso possibilitaria evitar a eutanásia de animais adultos saudáveis. O projeto foi aprovado pelo Comitê de Ética na Utilização de Animais da Universidade (Parecer 017/2011).

Consultamos alguns alunos para avaliar se a proposta teria adesão. Na primeira turma, 15 alunos aceitaram o desafio. Iniciamos as atividades com encontros semanais no horário de

We consulted some students to evaluate if the proposal would be successful. In the first class, 15 students accepted the challenge. We initiated the activities with weekly meetings at lunch time in the experimental laboratory. We decided not to provide students with any kind of a manual or a script. We just described the behavior that should be shown by the animal at the end of the semester: pick up the ball at any place of the court and put it in the right basket in an environment with another rat, and an illuminated "basketball court". A high noise level environment was added, predicting the probable conditions in which the game presentations would occur at the end of the work.

Students were to plan their own interventions. Each student created his own experimental environment, shaping procedure, and protocols. It was necessary to teach the rat to deal with the ball (ping-pong ball bored with soldering iron), to deal with another rat in the same environment, and with noise and light. As if all this was not challenging enough, we worked with food deprivation of four hours only, demanding identification of food with high appetitive value to each animal.

The semester was highly challenging and reinforcing. Throughout the training, sophisticated behaviors in students' repertoire were both selected and reinforced: increased sensibility to specific properties of participant behavior; agility in providing reinforcing consequences in a more immediate way — if the subject is learning in each training session then production of data to identify the progress has to be more precise; analysis of reinforcement contingencies present in each training; and management of conditions to promote animal learning. With every new challenge, there were also new discoveries, including many natural reinforcers of the student's behavior.

Over the course of training, students were gradually altering light and noise in the laboratory to avoid animals emitting anxiety responses in the presentations. The way of managing the noise was through adding music. At the end of semester, we were shaping behaviors in a laboratory, with listening, singing, and dancing the samba. The behavior analysis laboratory routine gained new dimensions. Shaping new behavior with joy and delicacy

almoço no laboratório experimental. Tomamos a decisão de não fornecer nenhum tipo de manual ou roteiro aos alunos. Apenas descrevemos o comportamento que deveria ser apresentado pelo animal ao fim do semestre: *jogar basquete (pegar a bola em qualquer lugar da quadra e encestá-la na cesta correta) em um ambiente com outro rato, iluminado e com alto nível de ruído*. O ambiente com alto nível de ruído foi adicionado prevendo as condições prováveis nas quais as apresentações dos jogos iriam ocorrer ao final do trabalho.

Mais do que seguir procedimentos, regras ou roteiros, foi solicitado aos alunos que planejassem suas próprias intervenções. Cada aluno deveria criar seu próprio ambiente experimental, seu procedimento de modelagem e seus protocolos de registro. Era necessário ensinar o rato a lidar com a bola de basquete (bola de ping-pong furada com ferro de solda...), a lidar com outro rato no mesmo ambiente e a lidar com barulho e luminosidade. Como se tudo isso não fosse desafiador o bastante, ainda trabalhamos com privação alimentar de apenas 4 horas, exigindo a identificação de alimentos com alto valor apetitivo para cada animal.

O semestre foi altamente desafiador e reforçador. Ao longo dos treinamentos foram selecionados e reforçados comportamentos sofisticados nos repertórios dos alunos: aumento da sensibilidade às propriedades específicas do comportamento do sujeito; agilidade para dispor as consequências reforçadoras de modo o mais imediato possível; produzir dados para identificar, com mais precisão, se o sujeito está aprendendo em cada sessão de treinamento; análise das contingências de reforçamento presentes em cada treinamento; e o manejo das condições para promover aprendizagens do animal. A cada novo desafio, novas descobertas e muitos reforçadores naturais aos comportamentos dos alunos...

Ao longo dos treinamentos, os alunos foram alterando gradualmente a intensidade de luz e de ruído no laboratório para evitar que os animais apresentassem respostas de ansiedade nas apresentações. A maneira de manejar o ruído foi com adição de música. Ao fim do semestre, estávamos modelando comportamentos no laboratório ouvindo, cantando e dançando samba. A rotina no laboratório de análise do comportamento ganhou novas dimensões para aquele grupo de alunos. Modelar novos comportamentos com alegria e delicadeza era nossa rotina.

No fim do semestre realizamos um evento aberto ao

was our routine.

At the end of the semester we held an event open to the public, presenting our basketball players. We had the presence of psychology professors, university staff, students from many courses, and children. The excitement of our students was contagious. To increase emotion, the matches were very competitive, and decided only in the last few seconds of each game. Children nervously awaited each score. Fred Keller's victory in the last game was not celebrated by them. All kids were cheering for the rat called Cheetos — how can one compete with a rat that has a name of a snack? We finished the day with the certainty that we produced something good. The satisfied smiles on the faces of our students, as well the complexity of the behaviors that they were capable of teaching to their rats, showed that our objectives were achieved.

Links of Interest:

Film explaining the project (Portuguese): https://www.youtube.com/watch?v=nwLF2jTBLdM

Didactical film about shaping (Portuguese): https://www.youtube.com/watch?v=oz8YbIfCtqE

Project's blog (Portuguese): https://jogosdeaec.wordpress.com/

Pictures of the championship day: https://picasaweb.google.com/115007018170686526902/1CampeonatoDeBasqueteDeRatosUP2011?feat=embedwebsite

público para apresentação de nossos jogadores de basquete. Contamos com a presença de outros professores de psicologia, funcionários da universidade, alunos de diversos cursos e crianças. A empolgação de nossos alunos foi contagiante. Para aumentar a emoção, as disputas foram muito acirradas e definidas apenas nos últimos segundos de cada partida. As crianças vibravam com cada cesta... A vitória de Fred Keller na partida final não foi muito comemorada pelas crianças... Todas elas estavam torcendo para o rato chamado *Cheetos* (como concorrer com um rato com nome de salgadinho?). Terminamos o dia com a certeza de que tínhamos produzido algo muito bom. A satisfação e o sorriso no rosto de nossos alunos, bem como a complexidade do comportamento que foram capazes de ensinar aos seus ratos, sinalizavam que provavelmente nossos objetivos tinham sido atingidos.

Links de interesse:

Filme explicando projeto (português): https://www.youtube.com/watch?v=nwLF2jTBLdM

Filme didático sobre o processo de modelagem (português): https://www.youtube.com/watch?v=oz8YbIfCtqE

Blog do projeto (português): https://jogosdeaec.wordpress.com/

Fotos do dia do campeonato: https://picasaweb.google.com/115007018170686526902/1CampeonatoDeBasqueteDeRatosUP2011?feat=embedwebsite

Fotos: https://picasaweb.google.com/115007018170686526902/1CampeonatoDeBasqueteDeRatosUP2011?feat=embedwebsite

technology

PORTL: Your Portable Skinner Box

By Jesús Rosales-Ruiz and Mary Hunter

Dr. Jesús Rosales-Ruiz is currently an associate professor and the chair of the Department of Behavior Analysis at the University of North Texas. He obtained his Ph.D. from the University of Kansas in 1995 under the direction of Dr. Donald M. Baer. During his graduate training he also worked closely with Dr. Ogden R. Lindsley. Dr. Rosales-Ruiz serves on several editorial boards, including the European Journal of Behavior Analysis and the International Journal of Psychology and Psychological Therapy. His areas of interest include stimulus control, behavioral cusps, fluency-based teaching, treatment of autism, problem solving, animal training, and rule-governed and contingency-shaped behavior.

Mary Hunter earned a master of science in behavior analysis from the University of North Texas (UNT) in 2013. Mary now teaches as an adjunct professor in UNT's department of behavior analysis and provides dog training services in the north Texas area through her training business, DogTrainingology. She also serves as the president of The Art and Science of Animal Training, a non-profit organization that provides educational programs for both pet owners and animal training professionals. In her free time, Mary trains service dogs for a local organization and writes about animal training on her blog, StaleCheerios.

The student reached for the little plastic polar bear, picked it up, and once again trotted it across the table. The teacher stared, perplexed, at the little bear. Her goal was to teach the learner to turn the toy polar bear upside down, then right side up, then upside down again and again. However, no matter what approximations she reinforced, the student kept trotting the bear across the table.

Reinforcement was infrequent, and both teacher and student were beginning to get frustrated. So the teacher took a break and stepped away from the table to brainstorm with one of the workshop instructors. As they discussed different ideas, the teacher suddenly hit on a solution that she thought might work, based on a concept that had been presented in one of the earlier lectures. Returning to the table, the teacher found four pencils, arranged them in a square, and placed the bear inside. Now, the teacher provided reinforcement to the student only when the bear stayed inside its new "corral." Since the square was much too small for trotting the bear, the student started experimenting with other types of movements. After just a short amount of time, the teacher had the student performing the target behavior of continuously turning the bear.

Afterward, during the discussion, the student said she was very hesitant at first to turn the bear and experiment with other movements. Polar bears, she explained, are supposed to trot, not turn!

During the past four years, Dr. Jesús Rosales-Ruiz and several of his graduate students at the University of North Texas have been developing PORTL, the Portable Operant Research and Teaching Lab. PORTL is a tabletop game that can be used to simulate a variety of learning situations, such as the encounter with the polar bear.

While teaching the learner to turn (and not trot!) the polar bear, the woman playing the role of the teacher discovered how a learner's previous experiences with certain objects can interfere during shaping and how to arrange the teaching environment to make it easier for the learner to successfully engage in the correct behavior. However, it wasn't just the teacher who made important discoveries during this exercise. The woman playing the role of the learner learned not only how to turn the polar bear, but also how her own emotions and feelings changed as the contingencies changed.

What is PORTL?

PORTL is a tabletop game that provides an interactive environment for individuals to learn about behavior principles and investigate behavioral phenomena. It had its beginnings in another shaping game, called GENABACAB, which was developed by the English dog trainer Kay Laurence. Several years ago, Laurence taught GENABACAB to Dr. Rosales-Ruiz and his graduate students. The students were hooked immediately and began playing the game with each other. They also started modifying the game to create an apparatus that could be used for both teaching and research.

PORTL teaches students to communicate entirely through reinforcement and environmental arrangement. The person playing the role of the teacher may not use verbal instructions, models, gestures, or prompts to direct the learner. However, learning is not left to chance or guessing. Through playing the game, students learn how to divide behavior into component skills and appropriate teaching steps, assess the learner's progress during

teaching, and adjust and revise their teaching plan as needed.

PORTL is played using a collection of small objects, a clicker to mark behavior, and small tokens or blocks for reinforcers. At the beginning of each exercise, the teacher presents the learner with a selection of objects. The learner is given only two instructions: "Your goal is to earn as many blocks as possible" and "Please interact with the objects." When the learner engages in the correct behavior or an approximation toward the correct behavior, the teacher sounds the clicker and hands the learner a token. The learner drops the token into a dish and then resumes interacting with the objects. As in the polar bear story, the teacher can rearrange the objects or add and remove objects to help guide the learner toward the goal behavior.

Occasionally, the teacher and learner take breaks to fill out datasheets and to give the teacher time to assess the learner's progress. Breaks can be taken after a certain number of tokens have been delivered (e.g. 10 tokens) or after a certain amount of time (e.g. 60 seconds). During a break, the teacher can consult with another student or with the workshop instructor.

PORTL: A laboratory for learning

Most students find it fairly easy to learn enough so that they can talk about behavior principles, but they have a more difficult time effectively applying those ideas to analyze and change behavior. Early behavior analysts recognized this, and, for decades, laboratory experience was an integral part of the undergraduate and graduate behavior analysis curriculum.

One of the first laboratory courses was at Columbia College. In a 1948 article, titled "Apparatus designed for introductory psychology at Columbia College," Frick, Schoenfeld, and Keller discuss the state of affairs before they added a laboratory component to their beginning course for undergraduate psychology students. They explain, "Although the introductory course presented psychology as an experimental science, it did not offer the student an opportunity to become acquainted with experimentation at first hand. While general principles underlying behavior were said to be experimentally demonstrable, the student was given no means for demonstrating them himself. The situation is now changed." Their year-long course included two lectures and four hours of laboratory work a week.

Other behavior analysts also recognized the many benefits of hands-on laboratory experience. In his classic 1963 laboratory manual, *Laboratory studies in operant behavior*, Jack Michael wrote, "The primary purpose of the laboratory is to bring each student into contact with behavior as an orderly experimental subject matter."

Michael's manual was also developed for use in undergraduate psychology courses. In contrast, in many of today's behavior analytic programs and psychology departments, laboratory experience is no longer part of the curriculum, both at the undergraduate and graduate levels. Students are at a disadvantage if they must learn behavior analysis entirely from textbooks. This is because enormous learning takes place when students can practice observing and changing behavior in a controlled environment, with the aid of a systematic, well-designed curriculum. PORTL provides an inexpensive laboratory apparatus that allows students to see the principles of behavior in action and practice applying those principles to change behavior. It is essentially a portable Skinner box for humans.

Students can learn to play PORTL quickly, since it involves simple equipment and minimal instructions. Through PORTL exercises, they can learn about reinforcement, extinction, discrimination, stimulus control, shaping, chaining, schedules of reinforcement, and other behavioral phenomena. This allows students to gain hands on experience with concepts they are learning in the classroom.

In addition to basic behavior principles, PORTL teaches students essential skills that are needed for both teaching and research. Students learn how to take an idea, develop it into a plan, and to arrange the teaching environment and contingencies. Then, while executing their plan, students practice observing and recording behavior and implementing accurate reinforcement delivery and timing. They also learn how to adjust their plan based on the learner's behavior.

PORTL also offers great flexibility for students who want to discover more about behavior by exploring topics that interest them. For example, classroom readings can come alive by having students choose significant laboratory experiments to replicate using PORTL. One experiment that can be easily replicated using PORTL is Skinner's classic experiment on superstition in the pigeon. Students can observe how certain behaviors get captured by time-based schedules and how the topography of the behavior shifts over time.

Guided PORTL exercises are currently being used in two undergraduate behavior analysis classes at the University of North Texas. These exercises help illustrate the principles being taught in class and teach the students useful skills so that they are better prepared to complete behavior change projects later in the curriculum. Teachers and students in these classes have learned that PORTL offers great potential as a classroom exercise. The students report that, as they experience behavior change first-hand, their understanding and excitement for behavior analysis grows.

Inquiry and research with PORTL

PORTL offers a simple, yet powerful, framework for studying human behavior. In addition to its use as a teaching tool, PORTL can be used as an apparatus for both inquiry and research. Often, students have questions about how particular behavioral phenomena work, but do not have easy access to experimental equipment for asking these questions. PORTL provides a perfect setup for students to get started

with exploratory projects, as well as research, since it involves simple, inexpensive, portable equipment and minimal setup time.

As a tool for inquiry, PORTL can be used to model different behavioral phenomenon, ask questions about controlling variables, and investigate the effects of changing a contingency. Often, students start the inquiry process by using PORTL to replicate a research study that interests them. To do this, students must analyze the study's design and identify the experimental contingencies and relevant variables. Students improve their analytic thinking skills as they figure out how to translate their questions into PORTL. The inquiry process gives students a more intimate understanding of the phenomenon they wish to study. One outcome of the inquiry process is that students develop behavioral baselines that can be used as the starting point for exploring new directions.

In addition to reproducing behavioral phenomenon, students can also inquire about how to best teach a behavior or sequence of behaviors. A student can begin by constructing a basic plan and testing it with several learners. The beauty of PORTL is that the human learner can give feedback at the end of the teaching process and let the teacher know which parts were learned easily and which parts were more confusing. The student can then revise and refine her teaching plan, making it a bit better each time, until she arrives at a plan that produces optimal learning and minimal errors for all learners with the required pre-requisite skills. A video on Youtube shows an example of the outcome of an inquiry process that explored how to teach a conditional chain with minimal errors. (https://www.youtube.com/watch?v=9XtEaOttMWI)

Once a student understands how to control relevant variables related to a phenomenon, PORTL can be used for full-fledged research studies. The convenience and low cost of PORTL as a research apparatus is noteworthy. In contrast, most laboratory equipment currently used for single subject research in the behavioral sciences is expensive and complex, and using it requires the investigator to possess extensive programming knowledge.

Another advantage of using PORTL for research is that the time required for each participant to complete the study is usually short, often under an hour. This is an advantage both for recruiting participants and for designing and refining experimental procedures at the beginning of a new research study.

At the University of North Texas, one student has conducted a master's thesis using PORTL. For her thesis research, Mary Hunter used PORTL to examine a phenomenon related to one-trial learning that had been reported by animal trainers in applied settings, but had not been previously studied systematically. Several more research projects at the university are currently underway that involve variable ratio schedules, resurgence, novel behavior, and using stimulus control to eliminate unwanted behavior.

Building empathy for the learner

PORTL is unique because the student not only gets to see the principles of behavior in action when playing the role of the teacher, but also gets to experience these principles in the role of the learner. Students report that being the learner is one of their favorite parts about PORTL. They often find it thrilling to be led step-by-step through a well-designed shaping plan, as they successfully discover what the teacher is teaching them. They also find it eye opening to be a confused and frustrated learner when they do not understand what the teacher is trying to teach them to do. Students not only experience the principles, but also get to feel the frustration and joy of learning. Playing PORTL helps build understanding and empathy because learners begin to relate to what their students or clients experience during the learning process. It also motivates students to improve their own teaching skills.

The learner also serves a useful role for the teacher. At the end of each exercise, the learner can reveal what he thought he was learning and how he felt during each part of the exercise. This provides the teacher with feedback concerning what she did well, as well as insight regarding which parts were confusing to the learner and why. Sometimes, there is a complete mismatch between what the teacher attempted to teach and what the learner actually learned. Discussion and analysis of the PORTL exercise helps students better understand how to construct teaching plans to achieve desired outcomes.

At a recent workshop in St. Louis, one exercise involved teaching three different concepts. Teachers first had to teach the learner to select objects of one color when a certain signal was given, then to select objects of a second color when a different signal was given, and, finally, to select a particular shape when a third signal was given. The objects used varied based on color, shape, size, texture, and other dimensions. Many teachers thought this exercise would be quite simple because their adult learners were already quite familiar with different colors and shapes.

Most of the teachers, however, had a bit of trouble teaching the shape discrimination. One learner who had been taught the colors red and blue thought at first that he was supposed to pick objects that were "not red and not blue." Another learner initially thought the opposite – that she was supposed to pick either a red object or a blue object. Still another learner learned to select several different objects that were all round, but never "realized" that she was supposed to pick the circular objects.

This exercise was eye opening for the participants and generated some thoughtful discussions about designing shaping plans. Many learners were amazed that they had so much trouble learning a shape concept. Workshop participants realized that when their learners are struggling to learn something "simple," it usually is not because the learner is dumb, is not trying, or is "messing" with them. Seemingly simple tasks become difficult depending on the learner's previous history or when a teaching plan does not take certain factors or variables into account.

In conclusion

PORTL is a simple behavior analytic tool that can be adapted to fit a variety of teaching and research situations. Students need very little training initially to start playing PORTL. However, as they gain more experience with the game, they can use it to ask and answer complex questions about behavior. This can give students a sense of discovery and help them get excited about learning about behavior analysis. PORTL's flexibility as both a teaching tool and research apparatus makes it useful for students, professors, researchers, and practitioners.

Kay Laurence: If We Are Not Succeeding in Training, Trainers Have Done It Wrong, Not the Dog

profile

Interview by Katie Copsey  and Kim Magat 

How did you become interested in dog training? How did you pursue your interest?

When I was 18, my father insisted that I train my first puppy, a Cavalier King Charles Spaniel, after meeting the dog for the first time at the airport. Specifically, my father greeted me with: "You'd better take that to training classes!"

That first training hall was difficult to find — poor lighting, back alley, rain, no parking. It took me so long to find it on my first trip to the hall, I was on the brink of giving up until I spied a person with a dog turning into the hall. That initial class was a pivotal moment in my life.

The beginning classes became my foundation. After a couple of years of training, I took my next dog, a working sheepdog, to the highest level in the sport of competition obedience.

I poured my passion into training. My off-work times would find me in multi-storey car parks, where free lighting and dry conditions gave me all I needed to practice. Lots of straight lines were a bonus.

There was no connection to learning theories and dog training. We just had to learn how to imitate our masters.

On your website you mention the terms "dog-centric training" and "trophy training." Can you explain these terms?

Dog sports were not designed for the benefit of dogs. Many folk regard their dog as a means to enjoy the sport, the success, and social life. I consider the dog's needs as primary, and my enjoyment of the sport secondary.

Even today, 40 years after I first stepped into a competition, I consider how my dogs work, and how they enjoy the experience. It is more important than any awards. The hobby is my interest, not my dogs'. They just come along to make me happy, so I consider it my challenge to make sure every second is a mutually enjoyable partnership.

Sports have taught me a lot about practice. We break down the exercises into the tiniest components, and adapt the skill for every dog. Some dog trainers consider sport training the pinnacle of dog training. Many sports trainers are highly motivated to explore and improve their skillset, thus improving the daily life of their dogs. These sport trainers share their knowledge through everyday training.

Which do you prefer: training dogs or training dog trainers? Why?

I enjoy teaching. I enjoy bringing understanding to my students and clients. I am motivated by seeing my students enjoy a deeper and closer relationship with their dogs.

Future trainers are a diverse group of people, with different cultures and passions. Yet, all are motivated by a desire to see their dogs progress with that special twinkle in their eyes.

How would you say the practice of dog training has evolved over your career and how do you think it will change in the next 5 years?

I am a product of self-teaching, and exploration. I have explored many different aspects of dogs: breeding and rearing, rehoming, working as a shepherd, search and rescue, lifeskills. Dogs are exceptionally good teachers when we take the time to listen to them.

On a working farm in the English countryside, nearly a mile from the nearest road, people and dogs come together from all over the world to learn from one of the world's top trainers, Kay Laurence. Kay has been a professional trainer for over 35 years. She currently holds workshops at her own training facility in the UK, across the United States, and around the world. Her wide dog training interests vary from sports to rehabilitation, and she believes dogs can teach us much more about teaching when we step back and learn to listen to them.

Kay is a regular speaker at Karen Pryor's ClickerExpo, and according to Karen, she is "one of the world's top clicker trainers." Kay has 10 titles published and translated into German, French, and Spanish.

I wonder if the courses available today had been available when I was in my twenties, would I have skipped the first-hand experience of slogging around mountains to learn more about dogs? I think the difference today is that future trainers expect to acquire a level of competency with more theory than practice.

I have a passion for tennis. I watch it all the time. I can talk about it quite extensively, especially in Wimbledon season. I could set up a class or course in tennis. But if a professional player saw me swing a racquet they would instantly recognise a lack of any competency. Sometimes I feel the same recognition when I see some current and future professionals hold the end of a leash or talk to a dog. The professional lacks the experience, or ability, to adapt to the needs on the individual dog. The person partnership is missing between the professional and the dog.

To what extent do you draw upon the principles of behavior analysis when conceptualizing your training techniques?

Probably more than I am consciously aware of. Even when I was 18, I had a strong belief that the dog did not have to do what we were teaching him, rather the dog should "want" to learn. I did all that I could to avoid coercion. I did not realize that this was an extension of a principle until I was doing a post-graduate course in teaching.

I was thrilled to find that I was not alone. The science gave me many hours of pleasure to explore and apply — to both people and dogs.

When you are training people who are new to dog training, how much do you elaborate on the concepts behind what you are teaching?

My elaboration on the concepts of what I teach is often dictated by the questioning or interest of the individual student or client. Usually my clients take interest when solutions come into view. This is when they may request more information about what is happening, and why it works. But honestly, the depth of the sharing is determined by my reflection of the learner's interest.

I began dog training, enjoyed it, and this led to more questions and exploration. I respect that others can choose to follow that path or not. My most common metaphors come from learning to drive a car and cooking. We all employ a range of skills to become competent, but not necessarily have the motivation to understand the underlying science.

Reflection question: What do you think is your greatest contribution to the field of dog training?

My greatest contributions to the field of dog training have been thoughtfulness rather than following a standard recipe, trend, or celebrity; the application of the science rather than a training method; and last but definitely not least, putting the dog's needs first.

What are some ethical considerations one should take prior to learning how to train their dog?

I published my lifeskills training book in 2012, and without shame adapted this Skinner quote to describe my philosophy: "I'm not trying to change people. All I want to do is change the world in which they live." My version: "We should not be trying to change dogs, but change the world in which they live."

So many methods of training are focusing on the wants of people through the suppression of canine behaviour. Dogs are fabulous at being dogs, we can find mutual success through changing the environment. So often the burden of change is on the dog, which for many, many dogs is far too heavy.

Which do you value more, play skills or obedience?

In my world, play skills are learning skills. I would hate someone to describe my dogs as obedient. This, thank goodness, is a term that is dying out. Just as we see schools teaching lifeskills, not obedience. Play skills build a connection with the owner, obedience does not.

I have not competed in the sport of obedience for 20 years. My passion now is freestyle. I enjoy routines of dance, stories, partnership with a dog with music. My obedience sport training had given me an exquisite understanding of training for precision. The dog's enjoyment and pleasure in completing the moves is primary in freestyle entertainment. The dog may appear to be "obedient", but the dog is truly responding to just one very, very long chain of cues.

How would you respond to a dog trainer who is losing motivation due to their dog's lack of progress or learning?

Dogs are extremely good at learning. They work hard. My usually advice is that if we are not succeeding within three attempts then we have done it wrong, not the dog.

Then the trainer should check whether what you think you are doing is actually what you are doing. Check to see if what you are doing is what you need to do. Look to see that the application is true and accurate. And, of course, the dog is always right.

What advice would you give to a dog trainer who is training a dog that they acquired later in the dog's life? In other words, would you suggest that the dog trainer do anything different to account for the dog's history of reinforcement and/or punishment?

The foundation material is the same for all learners. We begin with our initial reinforcers, good quality meat treats, placed away from the trainer to assess the dog's desire to re-engage with the trainer. This is the opening for every session, for every dog at any age. No expectation, just asking the learner: "Do you want to learn?"

The dog will cue us whether they are ready and listening. We place the treat away. Once eating is completed, or sometimes during eating the dog curiously returns to us to see if a repeat is possible. We take into consideration the control, pace, enquiry, fatigue, to meet the dog's needs at that time.

How do you assess needs of the dog being trained (say, an abused/neglected dog)?

We aim to build confidence and a pathway to teaching lifeskills. Lifeskills consist of teaching the dog to assess the environment, respond, adjust behaviour, make choices,

find solutions, mixed with learning how to come to a stop, standing with stillness, memory skills, along with other skills dependent upon each individual dog.

What is dressage training for dogs and why is it important to you?

I have no experience at all with horse riding. But horse folk are very well educated at some point in their schooling about the movement and gaits of horses. Dog folk are not.

The dressage term is commonly understood, and I am quite happy that we teach under that title if we learn more about the subtlety and nuances of movement, especially when it expresses behaviour. Dogs are exquisitely skilled at using balance, intent, an ear flick, to communicate. I think the courses and challenges are about teaching us about dressage not the dogs.

What are the most difficult problem behaviors you needed to re-train and why were these difficult?

I think the most upsetting situations are when two dogs that live together in the same environment are intent on causing each other harm. Sometimes there is no relief for either dog or the people with continual safety requirements. The environment often has to be managed rather than the dogs "trained."

I have no doubt we can train almost anything. The question is "should we?" This goes back to suppression rather than understanding. I like to build behaviour, not suppress it. Often the suppression of one behaviour leads to the specific problem. The dog is not the one who has the "problem" in these situations, it is the people.

What is your position on the many gadgets out there that claim to stop dogs from doing things people don't want them to do (e.g., incessant barking)? Do you think these devices are they effective in the long run?

I expect they may make people feel better. Our communities and societies put expectations in place that are hard to ignore. But our contract is with the dog we live with, not the approval of strangers.

People usually live with a dog they love. It worries me that the market makes people susceptible to to products that may cause unnecessary stress for the dog.

awards

The B. F. Skinner Foundation EABA Research Awards

by Zuilma Gabriela Sigurdardottir, PhD EABA President

Anastasia Salma

Ruth Kopperud

The board of European Association for Behaviour Analysis (EABA) is very happy to announce that a three-member election committee selected two awardees for the 2016 B. F. Skinner Foundation award. The award was delivered at our bi-annual conference in Enna, Sicily. EABA received a total of 5 applications, one for research in applied behavior analysis and four for experimental research, two of them can be regarded as translational research. All applications described interesting and very worthwhile research projects. This made the selection process rather difficult. The selection committee agreed on granting this year's awards to:

Anastasia Salma, a PhD student in Panteion University in Greece. Ms. Salma's dissertation research is a conceptual and theoretical analysis of the effects of differential reinforcement of variability (VAR) schedules that emerged in an analysis of failures to generate desired levels of variability in autistic children. Ms. Salma will use the award to purchase experimental equipment, including a computer.

Ruth Kopperud, MA student at Oslo and Akershus University College. Ruth's research focuses on methods to teach discrimination between benign and malignant melanoma. Ms Kopperud will use the award to get professional artists to design the necessary stimuli to be used in the discrimination training.

The committee and EABA board was very pleased to realize the numerous important and well designed research projects about to be executed by students of behavior analysis in Europe. The board looks forward to witnessing the growth of behavior analysis research in Europe.

research

Does Participant's Gender Interfere With Behavior Studies?

Tatiany Honório Porto
Translated by Bruna Colombo dos Santos

In its most diverse areas, science has a long research tradition of using male subjects. In behavior analysis, this research tradition is not different. So whenever you read about research that used animals as participants, try to remember the major part of those researchers used males.

In research that uses human participants, we frequently hear the generic phrase "subjects of both genders participated." However, most of the time the number of participants of each gender is not specified. Neither is it possible to identify the gender from data that are eventually presented.

Why has this happened in research and is gender a meaningless variable?

When behavior is defined as interaction between an organism and environment, it is clear this definition gives the same importance to the organism and the environment, emphasizing the role of interaction. Although it seems the emphasis in behavior analysts' practice is different, as environment is overestimated and organism's variables sometimes are neglected. It is important to look at possible differences in male vs. female and verify if they influence behavior in different way.

It is known that organisms with different concentrations and kinds of sexual hormones present differences in anatomy, chemistry and brain functioning during development (e.g., in structures such as hippocampus, neocortex, amygdala), which, in turn, can produce differences in interaction between organism and environment. As the gender defines concentrations and kinds of sexual hormones present in an organism, it is necessary to investigate if they cause differences in behaviors, what kind of differences and in what kind of behaviors.

Despite being a variable that lacks investigation, some neuroscience studies demonstrated differences in some kinds of behaviors as a function of gender. For example, male rats present the same pattern but different response rates than females under different reinforcement schedules. Males emit higher response rates than females

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A ciência, nas suas mais diversas áreas tem uma longa tradição na realização de pesquisas com sujeitos do sexo masculino. Na análise do comportamento não é diferente, tente relembrar as pesquisas que você já leu, principalmente aquelas que utilizaram animais como sujeitos, a maior parte dela utiliza machos.

Nas pesquisas com humanos ouvimos com grande frequência aquela frase genérica: participaram sujeitos de ambos os sexos, na maior parte das vezes não é especificado o número de sujeitos de cada sexo e nem é possível identificar nos resultados o sexo do sujeito em que o dado é apresentado.

Mas porque será que isso ocorre? Seria o sexo uma variável sem importância?

Se comportamento é definido como a interação entre o organismo e o ambiente, fica claro que essa definição dá igual importância ao organismo e ao ambiente, efatizando o papel de sua interação. Porém parece que a ênfase na prática dos analistas do comportamento é diferente: o ambiente é superestimado e as variáveis do organismo algumas vezes negligenciadas. É importante olharmos para possíveis diferenças no organismo e verificar se elas podem influenciar o comportamento de forma diferente.

Já é sabido que organismos com diferentes concentrações e tipos de hormônios sexuais durante o desenvolvimento apresentam diferenças na anatomia, química e/ou funcionamento do cérebro (e.g., em estruturas como hipocampo, neocórtex e amídala) que por sua vez podem acarretar em diferenças na interação do organismo com o ambiente. Como o sexo do sujeito define a concentração e o tipo de hormônio sexual presente em seu organismo é preciso investigar se eles podem causar diferenças em comportamentos, quais tipos de diferenças e em quais tipos de comportamentos.

Apesar de ser uma variável pouco investigada, alguns estudos, principalmente oriundos das neurociências, já demonstraram diferenças em alguns tipos de comportamento em função do sexo. Como por exemplo ratos machos apresentam o mesmo padrão, porém diferentes taxas de resposta do que fêmeas diante de esque-

in schedules where high behavior rates are reinforced - e.g., random ratio schedules and variable interval. In schedules in which low rates are reinforced, the inverse occurs with females demonstrating highest efficiency (i.e.; they receive a highest number of reinforcers compared to the number of emitted responses). One of the schedules where this highest efficiency was observed was differential reinforcement of low rates.

Some experiments showed that animals' castration reverses this behavioral difference. For example, in 1987, Heinsbroek, Haaren, Zantvoord and Van de Poll demonstrated that the castrated males they studied emitted fewer responses than normal males in random ratio schedules.

In 1973, Beatty obtained similar results. The females' castration decreased the difference between genders in response rates under a DRL schedule, producing less adapted responding to the schedule in females, that is, highest response rates and low reinforcer rates in participants. The castration also provoked some effect in males' response rates, but this effect was not statistically significant. One more study that supports the hypotheses of differences due to sexual hormones was made by Porto (2014). In this study, the castration increased females' response rate in VI schedule producing a response pattern more similar to observed with males.

Differences in behavior because of participants' gender were then observed in subsequent behaviors, such as in immunization of learned helplessness. The predictability and controllability of shocks were manipulated in this phase, when females and males were distributed amongst four groups. Groups were exposed to ten sessions with appetitive stimuli that could be predictable or unpredictable and controllable or uncontrollable, in all possible combinations.

All of the females exposed to controllable and predictable appetitive stimulus in the immunization phase learned the escape response in a test, even being exposed to uncontrollable aversive stimuli in an intermediate phase (called the treatment phase). Therefore, to the females, learned helplessness immunization is a function of predictability and controllability of appetitive stimuli. On the other hand, these variables did not have the same effect in male behavior, that also had been exposed to predictable and controllable stimuli in an immunization phase. The exposure was not sufficient enough for all the males to learn the escape response.

Other studies had already demonstrated that subjection to electric shock paralyzes more male rats than female rats. As a consequence, the electric shocks decreased the frequency of exploratory behaviors, and inversely it increased the frequency of behaviors indicators of stress, such as more frequent defecation.

Differences because of gender are present in passive avoidance tests, in which males take more time to drink water a second time if it is contaminated with a substance that has an aversive function. Females take less time to drink water again.

The results of these studies demonstrate that, facing the same contingencies, participants of different genmas de reforçamento diferentes. Machos emitem taxas de resposta maiores do que fêmeas em esquemas onde taxas altas de comportamento são reforçadas (e.g., esquemas de razão randômica e intervalo variável). Naqueles em que baixas taxas são reforçadas, o jogo se inverte, fêmeas tem demonstrado ter maior eficiência (i.e.; recebem um número de maior de reforços em relação ao número de respostas emitidas). Um dos esquemas em que essa maior eficiência foi observada foi o de reforçamento diferencial de baixas taxas (DRL).

Alguns experimentos mostraram que a castração dos animais reverte essa diferença de comportamento. Heinsbroek, Haaren, Zantvoord e Van de Poll (1987) que mostraram que machos castrados emitem menos respostas que machos normais no esquema de razão randômica.

Beatty (1973) também obteve resultados parecidos: a castração de fêmeas diminuiu as diferenças entre os sexos em relação às taxas de respostas de ratos submetidos ao esquema de DRL produzindo um responder menos adaptado ao esquema em fêmeas, ou seja, maior taxa de resposta e menor taxa de reforço em sujeitos desse sexo. A castração também provocou algum efeito na taxa de resposta de machos, porém esse efeito não foi estatisticamente significante. Mais um estudo que confirma a hipóteses das diferenças encontradas serem devido aos hormônios sexuais foi feito por de Porto (2014). Nesse estudo a castração aumentou a taxa de respostas de fêmeas no esquema de VI produzindo um padrão de respostas mais semelhante ao observado com machos.

Diferenças de comportamento a depender do sexo também foram observadas em outros comportamentos, por exemplo, na imunização do desamparo aprendido. A previsibilidade e a controlabilidade dos choques foi manipulada nesse fase, na qual fêmeas e machos foram distribuídos em 4 grupos e expostas a 10 sessões com estímulos apetitivos que poderiam ser previsíveis ou imprevisíveis e controláveis ou incontroláveis, com todas as possíveis combinações.

Todas as fêmeas expostas a estímulos apetitivos controláveis e previsíveis na fase de imunização aprenderam a resposta de fuga no teste mesmo sendo expostas à estímulos aversivos incontroláveis em uma fase intermediária (chamada de fase de tratamento). Portanto, para fêmeas, a imunização do desamparo aprendido é função da previsibilidade e da controlabilidade de estímulos apetitivos. Por outro lado, essas variáveis não têm o mesmo efeito no comportamento de machos, que apesar de terem sido expostos à estímulos previsíveis e controláveis na fase de imunização, essa exposição não foi suficiente para que todos os animais desse sexo aprendam a resposta de fuga no teste.

Outros estudos já demonstraram que a exposição a choques elétricos paralisa mais os ratos machos do que fêmeas, diminuindo a frequência de comportamentos exploratórios e aumentado a frequência de comportamentos indicadores de estresse, como por exemplo, a defecação.

Diferenças em função do sexo também são presentes em testes de esquiva passiva, onde machos demoram mais tempo para beber água novamente se ela é contaminada com uma substância com função aversiva do que fêmeas.

Os resultados desses estudos demonstram que se diante das mesmas contingências sujeitos de sexos diferentes emitem diferentes comportamento e que essas diferenças de comportamento podem ser revertidas ou atenuadas mediante castração dos sujeitos. Esses resultados chamam atenção para o sexo do sujeito como uma possível variável independente que deve ser levada em conside-

ders emit different behaviors and that differences in behavior can be reversed or attenuated by castration. These results call attention to gender as a possible independent variable that must be considered both in research with humans and with non-humans. We will only know clearly the importance of gender when we investigate more frequently if an effect of this variable exists in various behaviors and what the effect is.

ração tanto em pesquisas com humanos quanto em pesquisas com não humanos. A verdade é que só saberemos com clareza a importância do sexo do sujeito quando investigarmos com mais frequência se existe um efeito dessa variável em diversos comportamentos e se existir qual é esse efeito.

awards

The B. F. Skinner Foundation Best Poster Award at the XXV Brazilian Meeting of Psychology and Behavioral Medicine

In September of 2016, the XXV Brazilian Meeting of Psychology and Behavioral Medicine (ABPMC) and II South-American Meeting of Behavior Analysis took place in Foz do Iguaçu, Brazil. The event featured a poster session which highlighted empirical, historical, and conceptual research, experimental work, and applied technology. This year, ABPMC partnered with the B. F. Skinner Foundation to encourage students and professionals to participate in this activity. The authors of the winner poster received Skinner's books, donated by the B. F. Skinner Foundation and signed by Dr. Julie Vargas. In addition, they had an opportunity to write a brief report of their research for Operants *magazine.*

Research Report: Pauses Between High- And Low-Demand Swimming Excercises

Authors: Gabriel Meirelles Nasser, Juliana Werckmeister Thomazini, Bruno Angelo Strapasson (Universidade Federal do Paraná – UFPR).

Identification and characterization of reinforcement schedules are some of the main contributions of Skinner's em-

Relato de pesquisa: Pausas entre exercícios de natação de alta e baixa exigência

Autores: Gabriel Meirelles Nasser, Juliana Werckmeister Thomazini, Bruno Angelo Strapasson (Universidade Federal do Paraná – UFPR)

A identificação e caracterização dos esquemas de re-

pirical studies to the science of behavior. The way in which reinforcers are arranged produces specific behavioral patterns, and that understanding expanded our comprehension of how complex behaviors are established and maintained.

One of the better-known reinforcement schedules is the fixed-ratio schedule, in which reinforcers are obtained after a fixed number of responses. In this schedule, pauses in responding, after the reinforcer was obtained, are common. In *Schedules of Reinforcement*, Fester and Skinner demonstrated that these pauses are a function of the schedule requirements, where the greater number of responses required to produce the reinforcer resulted in longer pauses. Later, with the use of experimental designs with multiple reinforcement schedules, it was identified an organism tends to make greater pauses when the subsequent reinforcement schedules are more demanding. These effects were observed in a laboratory environment both in rats and pigeons, and in humans with intellectual disabilities.

The winning poster presented in the XXV meeting of ABPMC reported on a research performed in the natural environment. It investigated if, in physical activities analogue to fixed-ratio schedules and without the administration of arbitrary reinforcement, the same effects could be identified in two modalities of swimming training. Velocity and resistance training were used, in which series of fast and slow swimming and series of long (200m) and short (50m) distances were compared, respectively.

Seven regular students of a swimming academy participated in the research, completing 20 sessions each (10 velocity trainings and 10 resistance trainings). In each session, participants accomplished swimming exercise series arranged in semi-random order, so that two transitions of each type (high requirement – high requirement; high requirement – low requirement; low requirement – high requirement; low requirement – high requirement) were programed. The training sessions were filmed, and the data registered.

The announcement of a subsequent series with high requirement resulted in greater pauses for 5 participants in both types of training. For two participants, the effect was observed only in velocity trainings. For five participants, the effects of the requirement of the previous series were also found. These results suggest that both the announcement of high speed in velocity trainings and larger distances to be swum affect the duration of the pauses taken between exercise series. This study replicated the effects found with rats, pigeons and humans with intellectual disabilities in a laboratory context, but with average humans, in a natural environment and without the administration of arbitrary reinforcers. These results may contribute to the comprehension of procrastination (postponement of demanding tasks) and other complex human phenomena.

Translated by Bruna Colombo dos Santos

forçamento constituem algumas das principais contribuições dos estudos empíricos de Skinner. A demonstração de que o modo como são arranjados os reforçadores produz padrões específicos de comportamento ampliou nossa compreensão sobre como comportamentos complexos são estabelecidos e mantidos.

Um esquema de reforçamento simples mas bastante conhecido é o esquema de razão fixa, no qual reforçadores são obtidos após uma quantidade fixa de respostas ter sido emitida. Nesse esquema são comuns pausas no responder após a obtenção do reforçador. Ferster e Skinner haviam demonstrado que essas pausas são função da exigência do esquema de reforçamento, de modo que quanto maior é a quantidade de respostas exigidas para obter o reforçador, maior tende ser a pausa. Posteriormente, com a utilização de delineamentos experimentais com esquemas de reforçamento múltiplos, foi identificado que as pausas ocorrem sob controle tanto da exigência do esquema anterior à pausa quanto em função da sinalização do esquema subsequente. A tendência dos organismos é, nesses casos, de fazer pausas maiores quando os esquemas de reforçamento subsequentes são mais exigentes. Tais efeitos foram demonstrados tanto em ratos e pombos quanto com humanos com deficiência intelectual em ambiente de laboratório.

O painel vencedor do XXV encontro da Associação Brasileira de Psicoterapia e Medicina Comportamento realizado esse ano em Foz do Iguaçu, Brasil, relata uma pesquisa que investigou se, em atividades físicas em contexto natural, análogas aos esquemas de reforçamento de razão fixa e sem a administração de reforçamento arbitrário, os mesmos efeitos poderiam ser identificados em duas modalidades de treino de natação. Foram utilizados treinos de velocidade e treinos de resistência, nos quais foram comparados trechos de nado rápido e lento e trechos com distâncias longas (200m) e curtas (50m), respectivamente.

Sete alunos regulares de uma academia de natação participaram da pesquisa comparecendo a aproximadamente 20 sessões cada (10 treinos de velocidade e 10 treinos de resistência). Em cada sessão os participantes cumpriam 9 séries de exercícios de natação arranjados em ordem semi-aleatória de modo que duas transições de cada tipo (grande exigência-grande exigência; grande exigência –baixa exigência; baixa exigência-grande exigência; baixa exigência-baixa exigência) foram programadas por sessão. As sessões de treino foram filmadas e os dados registrados por meio do vídeo gravado.

A sinalização de uma série seguinte com maior exigência resultou em maiores pausas para 5 participantes em ambos os tipos de treino. Para os outros 2 participantes foi verificado efeito da sinalização apenas em treinos de velocidade. Para 5 participantes foram encontrados efeitos também da exigência da série de treino anterior. Estes resultados sugerem que tanto a sinalização de alta exigência em treinos de velocidade de velocidade quanto sinalização de grandes distâncias a serem nadadas afetam a duração das pausas realizadas entre séries de exercícios. No estudo replicou-se com humanos típicos, em ambiente natural e em situação sem administração de reforçadores arbitrários, os efeitos encontrados com ratos, pombos e humanos com deficiência intelectual obtidos em contexto e laboratório. Tais resultados têm implicações para a compreensão da procrastinação (o adiamento de tarefas exigentes) e de outros fenômenos humanos complexos.

fundraiser

B. F. Skinner Virtual Museum: The Foundation Needs Your Support!

The B. F. Skinner Foundation offices. Harvard Square, Cambridge

The B. F. Skinner Foundation receives many inquiries about Skinner. Researchers, students, and members of the general public request information about his study, his apparatuses, his unpublished materials, and his personal life.

With the technology now available, it is possible to show this material in virtual formats, including print, audio, and video as well as 360º views of objects as they are rotated and operated. The Foundation plans to create a virtual museum, showcasing the major aspects of Skinner's career and personal life. Fortunately, many materials are already available for this project: The Foundation has access to a large number of videos, including one showing all the special adaptations he made in his home study. The Foundation also has photographs both professional and personal, and digital copies of all of his articles and most of his books, along with the copyrights to many of them.

Through donations, the Foundation has collected teaching machines, operant chambers, cumulative recorders, and films showing Skinner giving lectures, shaping a pigeon, and discussing ethics and cultural design. The personal side of this scientist will also be included in the virtual museum. The Foundation will include photos or videos of toys that Skinner made for his children and grandchildren, of his study that has been preserved largely as he left it, of models of apparatuses he made, of artifacts like a mask and props he made for a banquet celebration, and many other items saved by his family.

The museum will be available online at www.skinnermuseum.org , and is anticipated to be an ongoing endeavor as new materials are found and added to the exposition.

We need your help to get the project off the ground. Our goal is to recruit at least 100 "sustainers" — people and organizations who will commit to monthly donations of at least $25 through 2017. Of course, all one-time donations, large and small, are appreciated as well. Please contribute as much as you can! To set up your montly contributions, please go to bfskinner.org and press the Donate Now button. If you prefer to send a check, please make it payable to B. F. Skinner Foundation and mail it to:

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