

1 **Examination of the Accuracy and Applicability of Information in**
2 **Popular Books on Dog Training**

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14 **Abstract**

15 There is a wealth of popular literature available on dog behavior and training; sourcing reliable and
16 trustworthy advice is important to achieving successful training. The aim of this study was to select five best-
17 selling (at that time) dog training books, and review their general content and references to basic learning
18 theory and human communicative cues. An Internet search was performed on three online bookstores'
19 websites for "best selling" "dog training" books. The books were by Millan and Peltier (2006), Fennell
20 (2002), Stilwell (2005), Pryor (1999), and Monks of New Skete (2002). The results showed marked
21 differences across all books, including inconsistencies in the depth of information provided, and some starkly
22 contrasting training methods were advocated. Overall, these books were not all considered to function as
23 instructional manuals. The persistent popularity of these books suggests that they have likely contributed
24 appreciably to the type of information accessed by dog guardians.

25

26 **Keywords**

27 books; dog; punishment; reinforcement; review; training; welfare

28

29 **Introduction**

30

31 The provision and accessibility of sound dog training advice is important. Undesirable dog behaviors (e.g.,
32 aggression, hyperactivity, destructive behavior) increase the likelihood of people relinquishing their dogs and
33 most dogs taken to animal shelters are surrendered because of perceived behavioral problems (Diesel,
34 Brodbelt, & Pfeiffer, 2010; Patronek, Glickman, Beck, & McCabe, 1996; Wells & Hepper, 2000). Dogs face
35 an uncertain future once at a shelter facility: some will be successfully re-homed, those in no-kill shelters
36 might remain there for the rest of their lives, and in some Western countries approximately one third of
37 shelter dogs are likely to be euthanized (Marston & Bennett, 2003; Patronek, Glickman, & Moyer, 1995).
38 Some research suggests a link between dog training and a lower incidence of behavioral problems. Kobelt,
39 Hemsworth, Barnett, and Coleman (2003) found that dogs who received obedience training were more likely
40 to obey commands than untrained dogs, and that obeying commands was negatively correlated with the
41 occurrence of behavior problems. People who have undertaken some form of training with their dogs report
42 that their dogs are less disobedient and participation in training activities, including discussing training and
43 reading books, is associated with a lower frequency of certain dog behavior problems (Arhant, Bubna-Littitz,
44 Bartels, Futschik, & Troxler, 2010; Bennett & Rohlf, 2007; Jagoe & Serpell, 1996). Thus, if people's
45 training attempts are more successful, fewer dogs may be relinquished. Guardians do not always attend dog
46 training classes, and they often seek information about dog training from books, the internet, and friends and
47 family (Bennett & Rohlf, 2007; Shore, Burdsal, & Douglas, 2008). Such sources are easily-accessed and
48 (frequently) free, thus the quality of information provided by such sources is of interest.

49 Dogs are trained to perform various tasks through the application of learning principles, namely
50 classical and operant conditioning, whether the trainer is aware of this or not. Surveys have found that most
51 companion dog guardians describe using operant training techniques involving both positive and negative
52 reinforcement and positive and negative punishment, such as giving food, verbal praise, physical
53 manipulation into a position, "time out", verbal reprimands, and smacking (Arhant et al., 2010; Blackwell,
54 Twells, Seawright, & Casey, 2008; Hiby, Rooney, & Bradshaw, 2004; Rooney & Cowan, 2011). Some
55 studies have found an association between people reportedly using only positive reinforcement training
56 methods and a lower incidence of reported dog behavior problems (Blackwell et al., 2008; Hiby et al., 2004).
57 In addition, the frequency with which people use punishment-based methods has been positively correlated

58 with the number of behavior problems their dogs have (Hiby et al., 2004), and higher rates of aggression
59 have been found in dogs whose guardians use a mixture of reinforcement and punishment (Blackwell et al.,
60 2008). It is, however, important to note that these relationships have not been determined to be causal – dogs
61 that do not display problem behaviors may simply not attract punishment and vice versa. Many dog
62 guardians have no formal training in behavioral science, thus it is important that learning principles are
63 presented to them so that their relevance and application are clear in order to maximize training efficacy.

64 Scientific research has examined various aspects of human-dog communication and dogs have been
65 found to be highly responsive to human behaviors. A study by Call, Bräuer, Kaminski, and Tomasello (2003)
66 found that dogs were significantly less likely to take a forbidden piece of food when a person was watching
67 them compared to when the person was out of the room, turned their back, was distracted or had their eyes
68 closed. Similarly, dogs obey commands better when they are the focus of humans' attention, compared to
69 when people are directing their attention elsewhere or are out of sight (Schwab & Huber, 2006; Viranyi,
70 Topál, Gácsi, Miklósi, & Csányi, 2004). Dogs have shown an ability to follow human pointing gestures in
71 numerous object-choice experiments (e.g., Dorey, Udell, & Wynne, 2010; Gácsi, McGreevy, Edina, &
72 Miklósi, 2009; Miklósi, Polgárdi, Topál, & Csányi, 1998; Soproni, Miklósi, Topál, & Csányi, 2001, 2002).
73 More subtle human gestures, such as nodding, head-turning and gazing, can also be used by dogs as cues to
74 indicate food or toy location (Ittyerah & Gaunet, 2009; Miklósi et al., 1998; Soproni et al., 2001). Dogs'
75 responses to these gestures suggest some comprehension of the referential nature of these cues. Dogs are also
76 sensitive to verbal communication. Small changes to a command word (e.g., "sit" being altered to "CHit"
77 and "siK") can result in significant decreases in dogs' performances (Fukuzawa, Mills, & Cooper, 2005), and
78 presenting a novel word prior to a command can reduce dogs' responses to known and newly-learned
79 commands (Braem & Mills, 2010). Despite the fact that individual dogs' success rates often vary in these
80 studies, the overriding conclusion is that dogs are very responsive to human communicative cues. Because of
81 this, it is reasonable to assume that such cues may have some impact during the dog training process. Thus,
82 people may benefit from advice on how and when to use such cues during dog training.

83 The purpose of this study was to select a sample of best-selling English-language dog training books
84 and examine their content with particular regard to learning theory and human-given cues. The aim was to
85 evaluate the accuracy and level of detail of the information given, and to compare the books with each other.

86

87 **Method**

88

89 ***Book Selection***

90 An Internet search was performed in August 2009 for dog training books on three major online bookstores'
91 websites: Amazon United Kingdom, www.amazon.co.uk; Amazon United States, www.amazon.com; and
92 Fishpond New Zealand, www.fishpond.co.nz¹. The search term "dog training" was entered, and the resulting
93 books were sorted by "best selling" from highest to lowest.

94 Five books were selected for review. These books appeared the most frequently within the top 10
95 listed books across all three websites. If any books appeared with equal frequency, the number of other listed
96 books by the same authors was taken into account when making the selection; i.e. books whose author also
97 had another book in the top 10 were chosen. Books dedicated specifically to puppy- and trick-training were
98 discounted from selection.

99 The books selected were (in order of descending popularity):

- 100 1. Millan, C., & Peltier, M. J. (2006). *Cesar's way: The natural, everyday guide to understanding and*
101 *correcting common dog problems*. New York, NY: Three Rivers Press.
- 102 2. Fennell, J. (2002). *The dog listener: Learning the language of your best friend*. London, England:
103 HarperCollins.
- 104 3. Stilwell, V. (2005). *It's me or the dog: How to have the perfect pet*. London, England: Collins.
- 105 4. Pryor, K. (1999). *Don't shoot the dog! The new art of teaching and training* (Rev. ed.). New York,
106 NY: Bantam Books.
- 107 5. Monks of New Skete (2002). *How to be your dog's best friend: The classic training manual for dog*
108 *owners* (2nd ed.). Boston, MA: Little, Brown and Company.

109

110

111 ¹Amazon.com was selected due to its global popularity; amazon.uk was chosen as another leading retailer in
112 an English-speaking country in which dogs are held in high regard; and fishpond.co.nz was included as a
113 major store in the authors' own country.

114

115

116 Although this search was originally conducted in 2009, it was replicated again in 2012 and results showed
117 that these same books remained listed in the top 11 best-selling books. In 2014 a similar search was also
118 performed (Amazon United States changed its website’s search criteria slightly and so books from that
119 website were ordered by “relevance”), showing that these titles featured in the top 20 listed books on these
120 websites (as well as several other titles by these same authors). The on-going popularity of these books
121 suggests a noteworthy measure of influence, and that this study remains relevant and these books continue to
122 provide a good representation of the information accessed by dog guardians in recent years.

123

124 ***Review Procedure***

125 Each book was read entirely, at least twice. The general content of each book and the authors’ approach to
126 training was evaluated and summarized.

127 Elementary aspects of learning theory (particularly operant conditioning) taken from scientific
128 literature and deemed to be particularly relevant to basic dog training were searched for. The books were
129 examined for explanations of reinforcement and punishment, including how accurately these concepts were
130 described. Definitions and examples of these concepts are in Table 1; descriptions falling within the scope of
131 these definitions were considered accurate. If the authors advocated using positive and/or negative
132 reinforcement and/or punishment, their descriptions of when or how to do this were noted, as were
133 references to the timing of reinforcement, punishment, or commands. This information was tabulated to
134 enable comparisons across the books. Use of classical conditioning was also recorded.

135 The books were also examined for references to particular human-given cues, which were selected
136 based on human-dog communication scientific literature (e.g., Fukuzawa et al., 2005; Miklósi et al., 1998;
137 Schwab & Huber, 2006; Soproni et al., 2001): eye contact, head or body orientation, proximity, body
138 position, hand or arm gestures, tone of voice, volume of voice, and pronunciation. For example: “Dogs
139 respond really well to vocal tone and pitch” (Stilwell, 2005, p. 68); and “The dog's extreme sensitivity to
140 movement means that hand signals and gestures are often much more useful in training than spoken
141 commands, especially if you are working at a distance” (Stilwell, 2005, p. 24). Each mention of advice on
142 the use of these cues was recorded and this information was summarized.

143 This information was documented when it was used in discussion of dog training in general terms
144 and when mentioned in relation to three tasks: “sit”, “down”, and “come”. These tasks are commonly trained

145 and employed by dog guardians, and as such clear explanations on how to train these tasks would be useful.
146 Thus, it may be expected that instructions on training these tasks would be included in dog training books.

147 The first author recorded the information based on definitions provided in academic literature. In
148 order to ensure reliability, any occurrences that were unclear were discussed with the coauthors to achieve a
149 consensus; only clear instances of these constructs were included.

150

151 -----

152 Table 1 here

153 -----

154

155 **Results**

156

157 *Cesar's Way: The Natural, Everyday Guide to Understanding and Correcting Common Dog Problems*

158 Millan's and Peltier's (2006) book, *Cesar's way: The natural, everyday guide to understanding and*
159 *correcting common dog problems*, is a guide to how Millan believes people should communicate with their
160 dogs. Millan is a self-taught dog trainer who achieved international prominence with his United States
161 television series *Dog Whisperer*; and this book is almost as much of an autobiography as it is about dog
162 behavior and training. The authors do not claim this book to be a training manual per se, but rather, its aim is
163 to "help you understand your dog's psychology better" (Millan & Peltier, 2006, p. 197). The concept of
164 dominance, and that people should act as "pack leaders", is a constant theme throughout this book. The
165 authors' definition of a pack and the roles within it, however, are at times contradictory. For example, at
166 different points throughout this book it is stated that a pack has only two roles ("leader" and "follower"), that
167 there are varying levels of status within a pack, and that all human household members should be a dog's
168 leader.

169 Positive reinforcement is discussed sometimes in this book, but it is not defined clearly (Table 2).

170 Millan and Peltier talk about "corrections" in some detail, however this term may be more accurately
171 described as positive punishment as the goal of corrections appears to be to stop unwanted behaviors. For
172 example: "If you send them to another room or put them outside, they probably won't make the connection
173 between the banishment and the bad behavior ... Corrections have to happen in the now – and be repeated

174 every time the rule is broken – before a dog will understand what aspects of her behavior are unwanted by
175 you” (Millan & Peltier, 2006, p. 217). And: “When I have a dog on a leash, I’ll give a little tug upward to
176 snap the dog out of unwanted behavior” (Millan & Peltier, 2006, p. 219). The methods for changing
177 unwanted behavior in this book tend to rely on the use of aversive stimuli, such as jerking on the lead. It’s
178 explained that the timing of corrections is important, and that they should be delivered at the instant the
179 undesired behavior occurs (Table 2).

180 Millan and Peltier describe in broad terms how “energy”, a “language of emotion” (Millan & Peltier,
181 2006, p. 66), is the main form of human-dog communication. Human-given cues are referred to, particularly
182 eye contact and volume of voice, but “projecting” the correct form of energy is the method of
183 communication underscored in this book (Table 3). For example: “... [at the dog park] you should be on the
184 alert, not standing in one place, but moving around the park and constantly connecting with your dog through
185 calm-assertive voice, eye contact, and energy” (Millan & Peltier, 2006, p. 254).

186 The authors clearly state this book “isn’t a “how-to” manual” (Millan & Peltier, 2006, p. 197), but
187 rather it is focused on teaching people how to understand their dogs’ behavior; and as such, no instructions
188 are provided on how to train basic behaviors such as sit (Tables 4 and 5).

189

190 -----

191 Table 2, 3, 4 and 5 here

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193

194 ***The Dog Listener: Learning the Language of Your Best Friend***

195 The author of *The dog listener: Learning the language of your best friend*, Fennell (2002), also featured in a
196 well-known United Kingdom television series, *The Dog Listener*. Fennell developed her training philosophy
197 through observing her own dogs and watching videos of wild canids, particularly wolves. She adheres
198 strongly to the notion of wolves and dogs having a hierarchical social structure, and this is reflected in how
199 she thinks dogs and people should interact. Many training situations and behavior problems are covered in
200 this book, during which constant comparisons are made between dog and wolf behavior and the “leadership”
201 role of people is emphasized. Anthropomorphisms, such as attributing feelings of responsibility to dogs, are
202 common throughout this book. For example: “The dog felt that he was responsible and did not want her [the

203 guardian] to go out into a world he felt she did not understand; an Alpha, by definition of its status, knows
204 best” (Fennell, 2002, p. 106).

205 Fennell does not explain learning principles or use much learning terminology, but provides many
206 examples of positive reinforcement and several of punishment (Table 2). She makes frequent reference to
207 “making positive associations” and “rewarding” dogs for desirable behavior. The author recommends the use
208 of negative punishment such as removing food and time outs as consequences for undesirable behavior,
209 although they are not described as punishment (and in one case, the author states that removing the dog from
210 a room for unwanted behavior should not be perceived as punishment). Timing of positive reinforcement is
211 mentioned, with the clearest instructions being that positive reinforcement should be delivered as the dog’s
212 rump touches the ground (when teaching sit), and “the second the dog comes” (Fennell, 2002, p. 81) (Table
213 2). In reference to toilet training, it’s explained that delayed positive punishment is ineffective. In teaching a
214 dog to sit, readers are instructed to give the command with the food, after the dog has performed the behavior
215 (Table 4).

216 This book emphasizes being calm when communicating with dogs. Fennell advocates ignoring dogs
217 in certain situations (e.g., when reuniting) and specifies that a lack of eye contact, touch, and verbalizations
218 are important when doing this (Table 3). For example: “The key to this then is that the dog must not be
219 engaged with in any way. By this I mean no eye contact, no conversation, no touching unless it is to gently
220 push the dog away” (Fennell, 2002, p. 77).

221 Fennell advises luring and giving “rewards” to dogs when teaching basic obedience tasks, but the
222 level of detail provided in the instructions is variable and they are not always detailed enough to be
223 replicated easily by a reader (Tables 4 and 5).

224

225 ***It's Me or the Dog: How to Have the Perfect Pet***

226 *It's me or the dog: How to have the perfect pet* by Stilwell (2005), accompanied the author’s popular United
227 Kingdom television series of the same name. Stilwell’s background with dogs is based on practical
228 experience: working as a dog walker, with shelter dogs, and running a dog training school. Her television
229 program focused on dogs who are challenging to train or that have behavior problems. This book covers a
230 wide range of topics from how to communicate with dogs, to recommended dog food, to teaching dogs
231 tricks.

232 Aspects of operant and classical conditioning are described in this book, although classical
233 conditioning in particular is not explained in much depth (Table 2). The author claims that all of her training
234 methods are “positive”; however, she does advocate the use of “corrections” (punishments) such as verbal
235 reprimands and time outs for when dogs do not respond to commands or are displaying unwanted behavior.
236 Timing of positive reinforcement and corrections is emphasized as being important, with the author
237 maintaining that feedback should be delivered within one second of the dog’s response (Table 2).

238 This book stresses the importance of effective communication between dogs and people, and gives
239 specific directions on how guardians should use their voice and body language during training (Table 3). For
240 example: “Vary your body positions. The dog should respond when you are sitting, crouching or standing,
241 not just when you are standing and facing him” (Stilwell, 2005, p. 76).

242 Step-by-step instructions are provided for teaching a selection of behaviors, including how and when
243 to use positive reinforcement (the form of operant conditioning most-frequently recommended) (Tables 4
244 and 5).

245

246 ***Don't Shoot the Dog! The New Art of Teaching and Training***

247 Pryor’s (1999) book, *Don’t shoot the dog! The new art of teaching and training*, explains the broad
248 principles of learning and their application in training situations. The author has years of experience in the
249 field of non-human animal training, particularly clicker training.

250 Despite its somewhat-misleading title, this book discusses methods of teaching and modifying
251 behavior in any species, including humans, and is not specific to dogs. There is a strong emphasis on the
252 application of positive reinforcement to train new behaviors and modify existing ones (Table 2). Pryor
253 describes shaping techniques in detail, establishing stimulus control, and how to get rid of undesirable
254 behaviors. The importance of timing of positive reinforcement is highlighted, with the author stating it
255 should be delivered in conjunction with the behavior in question, and that reinforcing too early or too late is
256 ineffective (Table 2). These concepts are not described solely in the context of dog training.

257 This book is a guide to the training of any animal, and so unsurprisingly it contains little mention of
258 human-dog communication with regards to human-given cues, and does not explicitly describe how to train
259 dogs to perform specific behaviors (Tables 3, 4, and 5). For example, reference is made to teaching a dog to
260 sit, but it is in the context of establishing stimulus control and describing when to introduce the verbal

261 command; the use of a hand signal, body position, and pronunciation is mentioned with no explicit
262 instructions (Table 3): “You can make the cue very broad: add a hand signal, body English, speak very
263 clearly” (Pryor, 1999, p. 72). This book had no explanation on how to teach a dog down, and a brief
264 reference to using a hand signal when training come: “We are essentially using targeting when we slap our
265 thighs to coax a dog to us. The movement seems to attract dogs, and when they approach, we reinforce the
266 behavior with petting” (Pryor, 1999, p. 58).

267

268 ***How to be Your Dog's Best Friend: The Classic Training Manual for Dog Owners***

269 The authors of *How to be your dog's best friend* (Monks of New Skete, 2002) have been training and
270 breeding dogs for over 30 years in their monastery in the United States. This book, first published in 1978,
271 covers an extensive range of topics from puppy selection to the death of a dog. The authors place emphasis
272 on having a good dog-guardian relationship, and advocate that good communication and training contribute
273 to this. They also think that humans should take a leadership, or “alpha”, role in this relationship.

274 The use of positive reinforcement and punishment are discussed frequently throughout this book
275 (Table 2). The authors, whilst acknowledging the behavioral definitions of the terms positive and negative
276 reinforcement and punishment (albeit with cursory explanations), proceed to assign their own labels to them.
277 For example, the authors use the word correction to describe “light discipline” (Monks of New Skete, 2002,
278 p. 68) such as verbal reprimands and jerking on the lead, and “punishment” to describe “more forceful verbal
279 and physical discipline” (Monks of New Skete, 2002, p. 68) such as shaking or hitting. They advocate that
280 the least amount of force necessary should always be used: “Build on your corrections, making them
281 progressively tougher until your dog responds appropriately. Above all, watch your dog: his response will
282 tell you whether the correction is too soft or too stern. Once you’ve obtained a consistent type of response,
283 stick to that level” (Monks of New Skete, 2002, p. 70). Timing of positive reinforcement and positive
284 punishment are mentioned regularly in this book; some of these instructions indicate giving rapid feedback,
285 others are less specific (Table 2).

286 Human-given cues such as eye contact, specific body positions, and using particular tones of voice,
287 are discussed frequently in this book. Such cues are mentioned in the context of communicating effectively
288 with dogs, and in specific training situations (Tables 3, 4, and 5). For example: “Make eye contact and give a
289 quick shake as you scold” (Monks of New Skete, 2002, p. 72). And: “Call the puppy in a light, happy tone of

290 voice, and when the puppy comes to you, praise her exuberantly ... You should be on your knees when you
291 call the pup. Your arms should be open wide, to help “funnel” the pup toward you” (Monks of New Skete,
292 2002, p. 196).

293 Detailed, replicable instructions on how to teach basic commands are given, accompanied by
294 illustrative photographs. Some of the methods recommended in this book include physical manipulation of
295 dogs into the sit or down positions (e.g., putting pressure on a dog’s back during down training), with the
296 application of positive reinforcement or punishment, depending on the success of the exercise (Tables 4 and
297 5). The authors recommend using particular physical cues when teaching a dog to come (Table 5).

298

299 **Discussion**

300

301 *General Content*

302 The books examined in this study differed in their overall focus and content. This study compared the
303 information contained in books found as a result of an online search for “dog training” books. A limitation of
304 this research was that the key words may not necessarily reflect the authors’ intention for how the book
305 should be used. For instance, neither Millan and Peltier (2006) nor Pryor (1999) claimed that their books
306 were dog training manuals by definition. Millan’s and Peltier’s (2006) book was aimed at teaching people
307 how to understand and communicate with their dogs using Millan’s concept of energy, as well as how to
308 modify undesirable behavior through his correction (positive punishment) techniques. Bearing this in mind,
309 this book’s usefulness as a general dog training text is, understandably, questionable. The aim of Pryor’s
310 (1999) book appeared to be explaining learning principles and their practical application to any species rather
311 than being a dog training manual per se, and as such a lack of dog-specific advice or examples was to be
312 expected. Nonetheless, these books were examined because they were listed as best-selling books found
313 using the key words “dog training”, and thus purchasers of these books may have anticipated dog-specific,
314 training advice.

315 Fennell’s (2002) book expounded her theory on pack hierarchy and leadership, and contained many
316 examples of the application of this theory seemingly changing dogs’ behavior. The constant reference to
317 leadership theory could cause people to overlook basic learned causes of behavior problems; and the frequent
318 anthropomorphisms may be problematic in helping people objectively assess their dogs’ behavior. Indeed,

319 unsubstantiated or incorrect assumptions are often made about dogs' emotional capacity (e.g., dogs looking
320 "guilty", Horowitz, 2009), and this can contribute to behavior problems (Bradshaw & Casey, 2007).

321 Stilwell (2005) and The Monks of New Skete (2002) took a more holistic approach to their books,
322 including information on topics from dog food to dog deaths. Both books emphasized human-dog
323 communication, and provided detailed training instructions that could be applied readily by guardians. Their
324 overall training methods, however, were in stark contrast to each other: Stilwell (2005) emphasized positive
325 reinforcement with the use of minor punishers (e.g., "ah ah ... a harsh, guttural sound"; p. 75), and luring
326 techniques for training basic tasks; whereas The Monks of New Skete (2002) readily recommended positive
327 punishment, some arguably harsh (e.g., "How hard do you hit the dog? A good general rule is that if you did
328 not get a response, a yelp or other sign, after the first hit, it wasn't hard enough"; p. 75), and physical
329 manipulation during training.

330

331 *Learning Theory*

332 Terminology

333 Some authors demonstrated a preference for non-behavioral terminology, and instead assigned their own
334 labels to the concepts. Millan & Peltier (2006), Stilwell (2005), and The Monks of New Skete (2002) used
335 the word correction to mean forms of punishment. Stilwell states that "a correction is not a punishment"
336 (Stilwell, 2005, p. 75). Although the corrections this author refers to (verbal reprimands and time outs) may
337 be formally classed as punishers when they reduce the problem behavior (e.g., Catania, 1998), they do not
338 cause physical pain to the dog. Training using these techniques and not advocating the use of electric shock
339 and pain is often termed as positive. The term reward was used by all authors with the exception of Pryor
340 (1999).

341 People don't necessarily need to know the scientific terminology for behavioral terms in order to
342 train their dogs successfully. However, terms such as "positive reinforcement" have become popularized,
343 particularly with the advent of dog training television series (such as those featuring some of these authors).
344 Inconsistencies surrounding both the use and meaning of such behavioral terms could lead to confusion.

345

346 Explanations of learning theory

347 There were inconsistencies between the explanations of learning theory across books. Some authors defined
348 these concepts in the same manner as they are operationally defined in academic literature, whereas other
349 explanations were cursory.

350 Pryor's (1999) book provided the most comprehensive explanation of learning principles, focusing
351 extensively on the theory and applications of positive reinforcement. Millan & Peltier (2006), Fennell
352 (2002), and Stilwell (2005) all omitted explanations of either reinforcement or punishment (or both, in the
353 case of Fennell's book), despite citing examples of both training methods throughout their texts. Whilst the
354 Monks of New Skete (2002) state that the lowest level of positive punishment that obtains the desired effect
355 should be used, their advice on progressively increasing the intensity of the punishment contrasts with that
356 given in scientific literature. Experimental evidence has shown that when positive punishment is introduced
357 at mild levels and gradually increased, animals can habituate to the punishment and continue responding
358 despite what eventually become relatively high levels of punishment; whereas if those same high levels of
359 punishment are introduced from the onset, the behavior often ceases (Mazur, 2001; Schwartz, Wasserman, &
360 Robbins, 2002). Thus from a perspective of efficaciousness and animal welfare it could be said that if
361 positive punishment is to be used, it should be introduced at a high intensity from the onset as this will be
362 most effective and require fewer punishments. Many dog guardians are not familiar with learning theory, and
363 accurate descriptions and explanations are likely to provide a greater understanding of them. This in turn,
364 may allow people to make better-informed decisions about when to apply these methods.

365 When to deliver positive and/or negative reinforcement and/or punishment was covered by all
366 authors, but the advice was not consistent. Stilwell (2005) and Pryor (1999) gave precise, replicable
367 instructions regarding timing of positive reinforcement: within one second of the desired behavior, and in
368 conjunction with the desired behavior, respectively. Millan & Peltier (2006) gave clear directives on when to
369 deliver positive punishment, stating it should be given the instant an undesirable behavior occurs. Fennell
370 (2002) discussed timing on occasion, and in one example, advocated issuing the command after the emitted
371 behavior – this could make it more difficult to get dogs to respond to commands. Some of the Monks of New
372 Skete's (2002) directions on consequence delivery featured immediacy. Academic literature generally places
373 importance on a close temporal relationship between the target behavior and reinforcement or punishment
374 (i.e., temporal contiguity). Reinforcement and/or punishment is considered most effective when delivered
375 immediately after an emitted behavior (Bouton, 2007). The degree of correlation between a behavior and its

376 effects (the reinforcer) is important during learning (Baum, 1973); that is, the occurrence of a behavior
377 during training has to be predictive of the reinforcer (i.e., contingency). While temporal contiguity alone is
378 not sufficient for learning, the shorter the delay between the behavior and its effects the higher the
379 correlation between these two events should be (Baum, 1973). Although animals can learn novel tasks when
380 positive reinforcement is delayed, such delays can decrease the correlation between the behavior and the
381 reinforcer (e.g., by giving time for other behaviors to occur before the reinforcers are delivered, thus
382 decreasing contingency), and so can also result in compromised speed of task acquisition and slower rates of
383 responding (Dickinson, Watt, & Griffiths, 1992; Lattal & Gleeson, 1990; Schlinger & Blakely, 1994). The
384 importance of timing was particularly emphasized in two books (Stilwell (2005) and Pryor (1999)) in this
385 review.

386

387 Training Techniques and Applicability

388 There was variability in the training techniques recommended across these books. Pryor (1999) was a
389 proponent of positive reinforcement techniques. Fennell's (2002) and Stilwell's (2005) books described
390 techniques that were technically positive reinforcement and positive and negative punishment, albeit strongly
391 biased towards positive reinforcement. The Monks of New Skete (2002) also advocated a mixture of positive
392 reinforcement and positive and negative punishment, although their positive punishments were more severe.
393 Millan's & Peltier's (2006) methods predominantly employed positive punishment for behavior
394 modification.

395 When evaluating the techniques described when training a dog to either sit, down, or come, only
396 Fennell's (2002), Stilwell's (2005), and The Monks of New Skete's (2002) books can be compared. (Millan
397 & Peltier (2006) and Pryor (1999) did not provide detailed instructions on how to train these tasks.) The
398 Monks of New Skete (2002) advocated using negative reinforcement (physical manipulation) when training
399 a dog to sit or lie down; this is surprising, as since the 1980s there has been a shift away from physically
400 coercing dogs during training. Despite this, their techniques were explained in detail, accompanied by
401 photographs, and would be easily replicable. On the other hand, not all of Fennell's (2002) non-coercive,
402 luring methods were described in enough detail to replicate easily. Stilwell (2005) also advocated non-
403 coercive training techniques, but explained them clearly, step-by-step.

404 It is important that dog guardians understand how and when to apply particular training techniques.
405 There is often variation in people’s ability to identify dog behavior, including aggression (Diesel, Brodbelt,
406 & Pfeiffer, 2008; Tami & Gallagher, 2009), which may lead to application of training methods inconsistently
407 or at inappropriate times. Many people who report using physically aversive training techniques (e.g., hitting
408 or kicking, grabbing jowls, or doing an “alpha roll”), state that their dogs responded aggressively to such
409 interventions (Herron, Shofer, & Reisner, 2009). Guardian-reported behavior problems often include
410 aggression, so the inappropriate use of physically aversive training techniques may pose dangers. Although it
411 is important to note that the choice of training methods employed by a person may be a reflection of the
412 behavior displayed by the dog (for example, there may be a stronger tendency for people to punish dogs who
413 are displaying problem behaviors), studies have found an association between the reported use of only
414 positive reinforcement and few behavior problems, and vice versa (Blackwell et al., 2008; Hiby et al., 2004).
415 Reward-based training methods have also been associated with dogs’ ability to learn a novel task, whereas
416 punishment-based training methods were negatively correlated with performance at a novel task and dogs’
417 levels of social interaction with an unfamiliar person (Rooney & Cowan, 2011). In addition to this, dogs can
418 display behavioral signs of stress (e.g., lowered posture) and physiological responses (e.g., increased cortisol
419 values) in response to aversive stimuli (Beerda, Schilder, van Hooff, de Vries, & Mol, 1998; Haverbeke,
420 Laporte, Depiereux, Giffroy, & Diederich, 2008). Although a causal link has not been established, it could be
421 argued that punishment-based techniques have been shown to be associated with fewer benefits than reward-
422 based training methods and in fact, have been associated with significant negative effects (e.g., aggressive
423 responses). Considering all of this, advising the general dog owning public to use physically aversive
424 training techniques, as suggested in some of these books, may not be the most prudent course of action in
425 terms of safety and animal welfare.

426

427 ***Human-given Cues***

428 Most of the books referred to the use of human-given communicative cues in general terms (e.g., when
429 greeting dogs, on walks, modifying undesired behaviors, etc.), with the exception of Pryor’s (1999) book
430 which contained very little of this. More-noticeable differences between books became apparent when
431 comparing the information provided regarding teaching the specific obedience tasks: sit, down, and come.

432 Millan & Peltier (2006) did not provide any instructions on how to teach these tasks. Pryor (1999)
433 mentioned using certain human-given cues when teaching sit and come, but without details. Fennell (2002)
434 gave instructions on proximity and using hand gestures during training sit, and several cues for teaching
435 come. Her description of training down contained scant detail, making it difficult for readers to easily
436 replicate. Stilwell's (2005) and The Monks of New Skete's (2002) books provided the most detailed advice
437 with regards to which human-given cues people should use when training the sit, down, and come
438 commands. Both of these books detailed the use of a range of human-given cues while training these tasks,
439 although The Monks of New Skete (2002) discussed more cues than Stilwell (2005) and also provided
440 photographs illustrating the training methods.

441 Academic literature has shown dogs to be receptive to human-given cues such as vocalizations,
442 pointing, and glancing (e.g., Fukuzawa et al., 2005; Miklósi et al., 1998). Because dogs are sensitive to
443 human cues and thus they may have an effect during training, dog guardians could benefit from using such
444 cues more judiciously. Although all of the books (with the exception of Pryor, 1999) did refer to human-
445 given cues throughout, when it came to explaining how to teach three common obedience tasks the level of
446 detail in the instructions was variable across the books.

447

448 **Conclusion**

449

450 Good dog training books should have information that readers can understand and apply, as well as a
451 scientific basis to their theories. A review of five popular "dog training" books found that these texts do not
452 all meet these functions, and thus are not necessarily instructional manuals for dog guardians. This study
453 revealed inconsistencies in the information provided with regard to learning theory and the use of human-
454 given cues during training. Clear, replicable information was not presented in all books, and some failed to
455 give precise instructions (e.g., Fennell, 2002). Training methods differed across the books, with some authors
456 (i.e. Millan & Peltier, 2006; Monks of New Skete, 2002) advocating positive punishments that may be
457 inadvisable for people to use. While Pryor's (1999) book contained in-depth discussions on aspects of
458 learning theory, the fact that it is a general training text (and thus lacks many dog-specific instructions) may
459 mean it doesn't fulfill all purchasers' needs if they are seeking a "dog training" book. Of all the books
460 examined in this study, Stilwell's (2005) book *It's Me or the Dog* reflects a relatively current understanding

461 of dog behavior and training techniques, combined with providing the most easily-applied information and
462 recommending methods generally accepted to be safest and easiest for dog guardians to replicate.

463 This study examined five popular dog training books, however, many others were not included.
464 Books such as *How to Behave so Your Dog Behaves* by Sophia Yin (2010), *The Complete Idiot's Guide to*
465 *Positive Dog Training* by Pamela Dennison (2011), and *How to Teach a New Dog Old Tricks* by Ian Dunbar
466 (1996) appear to be more adequate texts, and it would be interesting to review such books using this study's
467 criteria.

468 These books have consistently remained high on the best selling lists of three large internet retailers
469 over the past five years; this indicates the books' on-going popularity and that they probably contribute
470 significantly to the type of information that is accessed by dog guardians.

471

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473

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592 Table 1
 593 *The learning theory definitions, as described by Pierce & Cheney (2013), against which authors' descriptions of training techniques were compared for*
 594 *accuracy*
 595

Term	Definition	Example
Positive reinforcement	Presentation of a stimulus or event after a behavior that increases the probability of the response.	“Go outside with him and give him lots of praise and a treat when he does what he’s supposed to do” (Stilwell, 2005, p. 124).
Negative reinforcement	Removal or prevention of an ongoing stimulus or event by a behavior and subsequently the rate of that response increases.	“As you come to a stop, transfer your leash completely to your right hand, pulling up on it slightly. At the same time, with your left hand reach down and back and gently press down on Una’s rear end, easing her into a sit as you say, “Una, sit”” (Monks of New Skete, 2002, p. 233).
Positive punishment	Presentation of a stimulus or event after a behavior that decreases the probability of the response.	“When I have a dog on a leash, I’ll give a little tug upward to snap the dog out of unwanted behavior” (Millan & Peltier, 2006, p. 219).
Negative punishment	Removal of a stimulus or event after a behavior that decreases the rate of the response.	“Whenever this [dog growling at visitors] happened, I asked Steve and Debbie to get up and walk out of the room” (Fennell, 2002, p. 118).
Aversive stimulus	A stimulus that an animal avoids or attempts to escape from.	“Simply grasp her paws when the dog jumps up on you; gently move the paws slightly to the [<i>sic</i>] each side and begin moving slowly to keep the dog up on her two hind legs ... the dog becomes quite uncomfortable and wants to get down” (Monks of New Skete, 2002, p. 287).
Classical conditioning	When the control of respondent behavior is transferred from one stimulus to another by stimulus-stimulus association.	“Feed him, and then while he’s eating, try snipping the scissors or clippers near him. Do this a few times. He’ll begin to associate these tools with eating time, which will make for a more pleasant experience at the groomer’s” (Millan & Peltier, 2006, p. 251).

596

597 Table 2
 598 *Dog training information contained in books, discussed in reference to all situations other than training sit, lie down, and come behaviors*
 599

Author	Explanation of reinforcement	Explanation of punishment	Use of R+	Use of R-	Use of P+	Use of P-	Timing of command	Explanation of classical conditioning	Use of classical conditioning
Millan & Peltier	-	x	16(5)	0	21(4)	0	0	-	4
Fennell	-	-	30(8)	1	4	10	5	-	7
Stilwell	x	-	52(22)	0	9(2)	14(3)	16	x	15
Pryor	x	x	46(11)	2(3)	7	2	1	-	0
Monks	x	x	59(19)	1	58(27)	0	20	-	9

600
 601 *Note.* R+ = positive reinforcement, R- = negative reinforcement, P+ = positive punishment, P- = negative punishment. These data are instances of these
 602 techniques being advocated by the authors; the numbers in brackets represents the number of times the timing of these techniques was referred to. Presence of
 603 information = x; absence of information = -.

604 Table 3
 605 *Dog-human communication information contained in books, discussed in reference to all situations other than training sit, lie down, and come behaviors*
 606

Author	Eye contact	Head / body orientation	Proximity	Body position	Hand / arm gestures	Tone of voice	Volume of voice	Pronunciation
Millan & Peltier	13	8	6	3	4	2	15	0
Fennell	9	7	7	3	3	3	13	0
Stilwell	14	11	14	10	21	9	4	0
Pryor	0	1	0	0	3	1	1	0
Monks	18	15	12	18	18	19	18	2

607
 608 *Note.* These data are instances of advice being given on the use of these communicative cues.

609 Table 4
 610 *Dog training information contained in books, discussed with reference to training dogs to sit, lie down, and come*
 611

Author	Command	Use of R+	Use of R-	Use of P+	Use of P-	Timing of command
Millan & Peltier	Sit	0	0	0	0	0
	Down	0	0	0	0	0
	Come	0	0	0	0	0
Fennell	Sit	1(1)	0	0	1	1
	Down	1	0	0	0	0
	Come	6(1)	0	0	3	1
Stilwell	Sit	2(1)	0	0	1(1)	1
	Down	1(1)	0	0	0	1
	Come	2(1)	0	0	0	2
Pryor	Sit	1(2)	0	0	0	3
	Down	0	0	0	0	0
	Come	2	0	0	0	0
Monks	Sit	4(5)	2	1	0	3
	Down	7(7)	2	2	0	6
	Come	7(3)	0	8	0	11

612
 613 *Note.* R+ = positive reinforcement, R- = negative reinforcement, P+ = positive punishment, P- = negative punishment. These data are instances of these
 614 techniques being advocated by the authors; the numbers in brackets represents the number of times the timing of these techniques was referred to.

615 Table 5
 616 *Dog-human communication information contained in books, discussed with reference to training dogs to sit, lie down, and come*
 617

Author	Command	Eye contact	Head / body orientation	Proximity	Body position	Hand / arm gestures	Tone of voice	Volume of voice	Pronunciation
Millan & Peltier	Sit	0	0	0	0	0	0	0	0
	Down	0	0	0	0	0	0	0	0
	Come	0	0	0	0	0	0	0	0
Fennell	Sit	0	0	1	0	1	0	0	0
	Down	0	0	0	0	0	0	0	0
	Come	1	1	2	0	0	0	0	0
Stilwell	Sit	0	0	1	0	3	0	0	0
	Down	0	0	0	0	3	0	0	0
	Come	0	2	2	1	1	1	0	0
Pryor	Sit	0	0	0	1	1	0	0	1
	Down	0	0	0	0	0	0	0	0
	Come	0	0	0	0	1	0	0	0
Monks	Sit	0	1	0	1	2	0	0	1
	Down	2	5	1	7	6	2	0	0
	Come	3	1	3	5	4	3	0	0

618
 619 *Note.* These data are instances of advice being given on the use of these communicative cues.