Errata: Introduction to Bayesian Statistics

Page	Chapter	line	Correction
xviii	Pref.	3	"....Lance McLeay....."
xviii	Pref.	12	add "John Wilkinson for his comments on the R macros which resulted in improved code."
4	Ch. 1	31	"In those fields a different way to control outside factors is needed, because they can't be identified beforehand and physically controlled."
23	Ch. 2	40	" ... macro are in Appendix C."
73	Ch. 4	5	$B \times \textit{prior odds} = \textit{posterior odds}$.
101	Ch. 6	4-9	In Table 6.8 the likelihood values in the column headed (1,0) should be bold, not the values in the column headed (0,1)
104	Ch. 6	22	" They can be found in Table B.1, or evaluated..."
121	Ch. 7	1	"*In Table B.2 we find this area equals .2324.*"
121	Ch. 7	3	Equation should read $P(-.62 \leq Z \leq 1.37) = .2324 + .4147 = .6471$.
122	Ch 7.	2-4	Equation should read $P(Y > .4) = P\left(\frac{Y-.3243}{\sqrt{.005767}} > \frac{.4-.3243}{\sqrt{.005767}}\right) = P(Z > .997) = .1594$.
135	Ch. 8	34-36	Equation for Chris's prior should read $g(\pi) = \begin{cases} 20\pi & \text{for} \quad 0 \leq \pi \leq .10 \\ .2 & \text{for} \quad .10 \leq \pi \leq .30 \\ 5 - 10\pi & \text{for} \quad .30 \leq \pi \leq .50 \end{cases}$.
136	Ch. 8	9	"The exact shape of the prior doesn't matter very much."
139	Ch. 8	1	"When we have a $beta(a', b')$ posterior ..."
139	Ch. 8	13	"It is found ..."
140	Ch. 8	4	Bart's mean should be .265 and Barts St. Dev. should be .043

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144	Ch. 8	28	"... found in part (d)"
145	Ch. 8	2	"... found in part (d)"
145	Ch. 8	14	"... found in part (d)"
145	Ch. 8	25	"... found in part (d)"
154	Ch. 9	36	Equation should read $\hat{\pi}_f = \frac{y}{n}$
155	Ch. 9	3	Equation should read $\hat{\pi}_f \pm z_{\frac{\alpha}{2}} \times \sqrt{\frac{\hat{\pi}_f(1-\hat{\pi}_f)}{n}}$
155	Ch. 9	32	Footnote 5 should read "... developed by Neyman and Pearson ..."
159	Ch. 9	25	"... to the left of ..."
161	Ch. 9	24	"... $P(Y \geq 10) + P(Y \leq 5) = .302$. "
175	Ch. 10	14	"This is much less work!"
178	Ch. 10	17	Equation should read $m' = \frac{(\sigma^2 m + s^2 y)}{\sigma^2 + s^2} = \frac{\sigma^2}{\sigma^2+s^2} \times m + \frac{s^2}{\sigma^2+s^2} \times y\,.$
178	Ch. 10	19	Equation should read $m' = \frac{1/s^2}{1/\sigma^2+1/s^2} \times m + \frac{1/\sigma^2}{1/\sigma^2+1/s^2} \times y\,.$
179	Ch. 10	27-30	Think of the points above and below that you consider to be the upper and lower bounds of possible values of μ. Divide the distance between them by 6 to get your prior standard deviation s.
180	Ch. 10	16	"The shapes of the three priors are shown in Figure 10.1."
181	Ch. 10	3	Equation should read $m' = \frac{\frac{1}{4^2}}{\frac{1}{.5714^2}} \times 30 + \frac{\frac{12}{2^2}}{\frac{1}{.5714^2}} \times 32 = 31.96\,.$

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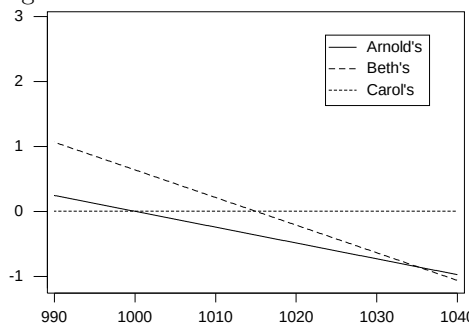
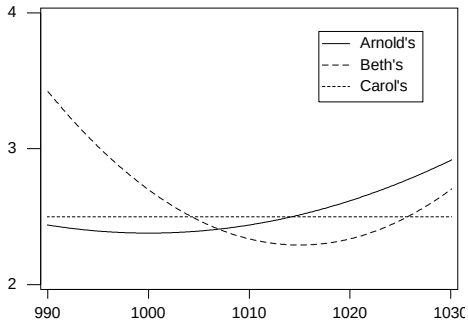
183	Ch. 10	10	"When we start with ..."
185	Ch. 10	15	"We recognize this as a normal density with mean $m' = m_n$ and variance $(s')^2 = \sigma^2 + s_n^2$.
186	Ch. 10	23	$normal(m', (s')^2)$ where the mean $m' = m_n$, the posterior mean, and $(s')^2 = \sigma^2 + s_n^2$, the observation variance plus the posterior variance. (The posterior variance s_n^2 allows for the uncertainty in estimating μ.)
194	Ch. 11	34	Equation should read $\left[\frac{n/\sigma^2}{n/\sigma^2+1/s^2}\right]^2 \times \frac{\sigma^2}{n} = \left(\frac{ns^2}{ns^2+\sigma^2}\right)^2 \times \frac{\sigma^2}{n}$
195	Ch. 11		Figure 11.1 
195	Ch. 11	16	" (Arnold)...mean 1000 and standard deviation 10 .."
195	Ch. 11	18	" (Beth)...mean 1015 and standard deviation 7.5 .."
196	Ch. 11		Figure 11.2 
196	Ch. 11	12	" ...performance over most of this range."

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199	Ch. 11	17	Equation should read $H_0 : \mu \leq \mu_0 \quad \text{versus} \quad H_1 : \mu > \mu_0\,.$
202	Ch. 11	5	Should read $\int_{-\infty}^{31} g(\mu \vert y_1, \ldots, y_n) d\mu$
204	Ch. 11	5	Equation should read $\mu_0 < \bar{y} - z_{\frac{\alpha}{2}} \times \frac{\sigma}{\sqrt{n}} \;\text{ or }\; \mu_0 > \bar{y} + z_{\frac{\alpha}{2}} \times \frac{\sigma}{\sqrt{n}}$
212	Ch. 12	5	" ...shown in Table 3.3. "
218	Ch. 12	18	"for π_2 is $beta(a_2', b_2')$, where ..."
218	Ch. 12	35	Equation should read $P(\pi_d \leq 0) = P\left(\frac{\pi_d - m_d'}{s_d'} \leq \frac{0 - m_d'}{s_d'}\right)$
227	Ch. 12	16	"(b) Find the posterior distribution of $\mu_1 - \mu_2$"
227	Ch. 12	19	Equation should read $H_0 : \mu_1 - \mu_2 = 0 \quad \text{versus} \quad H_1 : \mu_1 - \mu_2 \neq 0$
228	Ch. 12	3	"(b) Find the posterior distribution of $\mu_1 - \mu_2$"
228	Ch. 12	8	" ...discharges its cooling ...."
228	Ch. 12	24	(b) "Find the posterior distribution of $\mu_1 - \mu_2$"
229	Ch. 12	32	(b) "The index of refraction of the fragments...."
230	Ch. 12	18	Equation should read $H_0 : \mu_d = 0 \quad \text{versus} \quad H_1 : \mu_d \neq 0$

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231	Ch. 12	33	"...proportions of New Zealand women ..."
232	Ch. 12	10	Equation should read $H_0 : \pi_1 - \pi_2 \leq 0 \quad \text{versus} \quad H_1 : \pi_1 - \pi_2 > 0$
232	Ch. 12	17	"...proportions of New Zealand women ..."
232	Ch. 12	29	Equation should read $H_0 : \pi_1 - \pi_2 \geq 0 \quad \text{versus} \quad H_1 : \pi_1 - \pi_2 < 0$
233	Ch. 12	28	Equation should read $H_0 : \pi_1 - \pi_2 \geq 0 \quad \text{versus} \quad H_1 : \pi_1 - \pi_2 < 0$
245	Ch. 13	3	" ...complete the square, and absorb ..."
246	Ch. 13	23	Equation should read $\frac{1}{(s'_\beta)^2} = \frac{1}{.3^2} + \frac{.674475}{.0320753} = 32.1389\,,$
246	Ch. 13	25	Equation should read $s'_\beta = 32.1389^{-\frac{1}{2}} = .176\,.$
246	Ch. 13	27	Equation should read $m'_\beta = \frac{\frac{1}{.3^2}}{32.1389} \times 1 + \frac{\frac{.674475}{.0320753}}{32.1389} \times 1.29963 = 1.196\,.$
246	Ch. 13	29	Equation should read $\frac{1}{(s'_{\alpha_{\bar{x}}})^2} = \frac{1}{1^2} + \frac{25}{.0320753} = 780.414\,,$
247	Ch. 13	2	Equation should read $s'_{\alpha_{\bar{x}}} = 780.414^{-\frac{1}{2}} = .0358\,.$
247	Ch. 13	4	Equation should read $m'_{\alpha_{\bar{x}}} = \frac{\frac{1}{1^2}}{780.414} \times 15 + \frac{\frac{25}{.0320753}}{780.414} \times 14.221 = 14.222\,.$
248	Ch. 13	8	Equation should read $= P\left(Z \leq \frac{\beta_0 - m'_\beta}{s'_\beta}\right),.$
248	Ch. 13	9	"If this probability is less than α we reject ... "
248	Ch. 13	13	"... to find a 95% Bayesian credible interval"
248	Ch. 13	13	"The interval is (.831,1.561)

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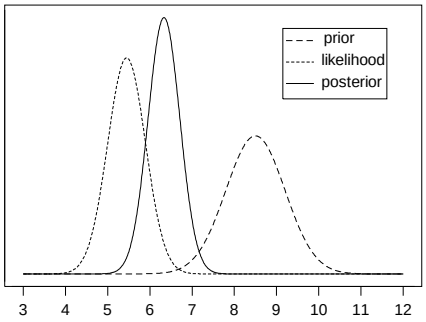
253	Ch. 13	3	at the 5 % level of significance.
253	Ch. 13	28	at the 5 % level of significance.
254	Ch. 13	18	at the 5 % level of significance.
255	Ch. 13	24	at the 5 % level of significance.
256	Ch. 13	25	at the 5 % level of significance.
256	Ch. 13	28	"...McGhie (1984). These ..."
256	Ch. 13	30	"...the pattern. It is likely ..."
264	Ch. 14		Figure 14.2 legend should be changed to 
267	Ch. 14	17	"We can evaluate the first integral numerically"
269	Ch. 14	3	Equation should read $\propto \frac{1}{\sqrt{s_i^2+\sigma^2/n}} \times e^{-\frac{1}{2(s_i^2+\sigma^2/n)}(\bar{y}-m_i)^2}$,
274	Ch. 14	1	"You are going to take ..."
274	Ch. 14	14	"You are going to take ..."

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295	App. B	4	Equation B.1 should read $P(Y = y\|\pi) = \left(\begin{array}{c} n \\ y \end{array} \right) \pi^y (1-\pi)^{n-y}$.
308	App. C	7	size 20;
310	App. C	7	.2 .3 .5
310	App. C	10	prior c1 c2;
310	App. C	21	posterior c4.
311	App. C	3	prior c1 c2;
313	App. C	13	prior c1 c2;
313	App. C	22	norm 3 2;
313	App. C	23	prior c1 c2;

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317	App. D	9	... R (currently 2.0.1) may ...*http:www.r-project.org.*
317	App. D	13	...click on the file *rw2001.exe* and ...
319	App. D	31	`Library(Bolstad)`
320	App. D	1	`res$means`
320	App. D	4	`res$samples[,`i`]`
320	App. D	6	`res$samples[,50]`
321	App. D	15-16	`results <-binodp(5,6,uniform=FALSE,theta=theta, theta.prior=theta.prior,ret=TRUE)`
323	App. D	1	`cdf<-sintegral(theta,results$posterior, n.pts=length(theta),ret=TRUE)`
323	App. D	5-7	... containing vectors `x` and `y`, where the i^{th} element of `cdf$y` is equal to $\Pr(Y \leq x)$, where x is the i^{th} element of `cdf$x`.
323	App. D	9-11	`lb<-cdf$x[with(cdf,which.max(x[y<=0.025]))]` `ub<-cdf$x[with(cdf,which.max(x[y<=0.975]))]`
323	App. D	18-19	`dens<-theta*results$posterior` `post.mean<-sintegral(theta,dens)`
325	App. D	28	Equation should read $g(\mu) = \begin{cases} \frac{1}{3} + \frac{\mu}{9} & , -3 \leq \mu \leq 0 \\ \frac{1}{3} - \frac{\mu}{9} & 0 < \mu \leq 3 \end{cases}$.
326	App. D	5	`cdf<-sintegral(mu,results$posterior`
326	App. D	9	...containing vectors `x ...`
326	App. D	13-15	`lb<-cdf$x[with(cdf,which.max(x[y<=0.025]))]` `ub<-cdf$x[with(cdf,which.max(x[y<=0.975]))]`

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335	Sel. Ans.		The prior probabilities should each be $\frac{1}{10}$ with consequent changes in the tables
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339	Sel. Ans.	15	996 .0021 997 .1048 998 .5548 999 .3183 1000 .0198 1001 .0001
339	Sel. Ans.	30	$P(\mu < 1000) = .9801$
340	Sel. Ans.	19	The posterior distribution of θ is $normal(1392.8, 16.6^2)$
340	Sel. Ans.	26	Equation should read $m' = \frac{\frac{1}{10^2}}{2.51} \times 75 + \frac{\frac{10}{2^2}}{2.51} \times 79.430 = 79.4124$
340	Sel. Ans.	27	The posterior distribution is $normal(79.4124, .63119^2)$
341	Sel. Ans.	1	The 95 % Bayesian credible interval is (78.18,80.65)
341	Sel. Ans.	3	Equation should read $P(\mu \geq 80) = .176$
347	Sel. Ans.	16	"The posterior $g_0(\pi\|y = 10)$ is $beta(7 + 10, 13 + 190)$".
347	Sel. Ans.	17	"The posterior $g_1(\pi\|y = 10)$ is $beta(1 + 10, 1 + 190)$".
347	Sel. Ans.	25	Should read $g(\mu\|y_1, \ldots, y_6) = .123 \times g_0(\mu\|y_1, \ldots, y_6) + .877 \times g_1(\mu\|y_1, \ldots, y_6)$.
349	Ref.	10	Jaynes, E. T., G. Larry Bretthorst (Editor), (2003), *Probability Theory: The Logic of Science*, Cambridge University Press
350	Ref.		McLeay, L. M., Carruthers, V. R., and Neil, P. G. (1997), Use of a breath test to determine the fate of swallowed fluids in cattle, *American Journal of Veterinary Research* 58, 1314-1319.