

## Basics of EEG interpretation

!"## \$%&'()\*+,-./%01#23"#4(5#667#89#05:5'15;#<595%&:8=5;#058=>%50"#  
?@@AB?CDEFGC! ?HCC?";)8@!@!@IJK@!"L9M"@@@??NEIA"AA?EA"5@#

?## 0:>P5#Q4"#3%<#5RR5'10#)9#667"# "##?@@AB?CDEFGC@AHC!!"#  
;)8@!@!@IJK@!"L9M"@@@??!CJ"IECNE"R&#

C"## S59;5=#T6.#0%5995%,U"#W9'%5&089<#1(5#+85;:#)R#667"# "##?@@AB?CDEFG?N?H?IC"#  
;)8@!@!@IJK@!"L9M"@@@??NW!E"E@??J"! ?#

E"## X5%P&#-.#, &;1Y5#, "#667#)R#M&%18&:#058=>%50"# "##?@@AB?CDEFGCCCHCCI"#  
;)8@!@!@IJK@!"L9M"@@@??NEIJ"NIJCE"J&#

W"## 4&1>P#QT.#\$>0&89#-S.#059Z&;80#[,.#\&M:&9#UQ"#])%P&:#&;>:1#667#&9;#M&115%90#)R#>9'5%1&89#  
08<98R8'&9'5"# "##?@@AB?CDEFG!IEH?@J"#;)8@!@!@IJK@!"L9M"@@@??@!@!"I?!?A"&A#

A"## 059Z&;80#[ "#4(5#667#89#])95M8:5M18'#058=>%50"# "##?@@AB?CDEFGCE@HCW?"#

J"## \&95#] .#-' (&%+&#2.#0598'Y=+#[.#51#&:#-#%5\*805;#<:)00%#+#)R#15%P0#P)01#)PP)9;+#>05;#Z+#':898'&:#  
5:5'1%)59'5M(&:)<%&M(5%0#&9;#>M; &15;#M%)M)0&:#R)#1(5%5M)%1#R)%P&1#)R#1(5#667#89;89<0"#  
,5\*808)9#?@!J"#

!N"# \$&.R)%; #22.#[&Z>#3.#3%80:&95#/Q.#40>' (8; &#4] .#[89(&#[, "#- P5%8' &9#a:898' &:#] 5>%)M(+08):<+#[ ]' 851+#7>8; 5:895#EG#, 5')%; 89<#a:898' &:#667#)9#38<81&:#S5; 8&# " #?@! ABWADEFG?A! H?AW"# ;)8G! @"! @N@K?! AEAN?! "?@! A"! ?EWWAC#

!I"# \>%&1&98#2.#U5&%:#U\_#[::8\* &9#\_ , .#51#&:"#- P5%8' &9#a:898' &:#] 5>%)M(+08):<+#[ ]' 851+#7>8; 5:895#WG# S898P>P#45' (98' &:#[1&9; &%; 0#R)%#U5; 8&1%8' #6:5' 1%)59' 5M(&:.)<%&M(+ "# #?@! ABWADEFG?AAH?JW"#; )8G! @"! @N@K?! AEAN?! "?@! A"! ?EWWAN#

?@"# [15' Y5%#SS.#[&Z>#3.#[::8\* &9#\_ , .#51#&:"#- P5%8' &9#a:898' &:#] 5>%)M(+08):<+#[ ]' 851+#7>8; 5:895#AG# S898P>P#45' (98' &:#[1&9; &%; 0#R)%#667#, 5')%; 89<#9#[>0M5' 15; #a5%5Z%&:#35&1(" "# #?@! ABWADEFG?JAH?NE"#; )8G! @"! @N@K?! AEAN?! "?@! A"! ?EWWJW#

?I"# 4&1>P#QT.#[5:8]>10Y8#T.#T' ()&#27.#51#&:"#- P5%8' &9#a:898' &:#] 5>%)M(+08):<+#[ ]' 851+#7>8; 5:895#JG# 7>8; 5:8950#R)%#667#, 5M)%189<"# " #?@! ABWADEFG?NWH?I C"# ;)8G! @"! @N@K?! AEAN?! "?@! A"! ?EWWJA#

??"# [' (5RR5%#W.#05%Y) \*8' #[#a&M) \*8: &#7.#51#&:"#\_ -6# :&008R8' &18) 9#)R#1 (5#5M8:5M0850G#U)0818) 9#M&M5%#)R# 1(5#\_ -6#a) PP8008) 9#R)%#a:&008R8' &18) 9#&9; #45%P89):<+ "# " #?@! JG! H! @"# ;)8G! @"! !!! K5M8"! CJ@I #

?C"# /80(5%#, [#a%)00#Z\$.#3b[ ]>=&#a.#51#&:"#901#>' 18) 9#P&9>&:#R)%#1 (5#\_ -6#?@! J#)M5%&18) 9#:# ':&008R8' &18) 9#)R#058=>#5#1+M50"# " #?@! JG! H! ?"#; )8G! @"! !!! K5M8"! CAJ! #

?E"# \$5%P&9#[4.#-Z59; #] [#0:5' Y#4U.#51#&:"#a) 90590>0#1&15P591#) 9#) 9189>)>0#667#9#%818' &::+#R::# &;>:10#&9; #' (8; %59.#M&%1#NG#9; 8' &18) 90"# " #?@! WBC?D?FGNJHI W"# ;)8G! @"! @I JKQ] U"@@@@@@@@@@@@@! AA#

?W"# \$5%P&9#[4.#-Z59; #] [#0:5' Y#4U.#51#&:"#a) 90590>0#[1&15P591#) 9#a) 9189>)>0#667#9#a%818' &::+#:# -; >:10#&9; #a(8; %59.#U&%1#NG#U5%) 995:.#45' (98' &:#[M5' 8R8' &18) 90.#&9; #a:898' &:#U%&' 18' 5"# " #?@! WBC?D?FGI AH! @N"#

?A"# 7&0M&%; #] .#S&9<&9&0#\_# , &PM&:#] .#U51%)RR#T -a.#\$8%0' (#\_2##[8P8:&%81+#)R#&15%&:8=5; #%(+1(P8' #; 5:1&# &' 18\*81+#1)#M5%8); 8' #:&15%&:8=5; #5M8:5M18R)%P#; 80' (&%<50#9#%818' &::+#R::#M&185910"# "# #?@! CBJ@D! @FG! ?NNH! ?I W"#; )8G! @"! @@! K^&P&95>):"?@! C"CEJW#

?J"# , )%;<>5=#X.#, ) ; ; 59#S/.#\_& , )' (5#[S"#1&:H8915%8' 1&:#) 9189>>Pg-#M%)M) 05; #1%5&1P591# &:<)&81(P"# " #?@! AB! ?JDEFG?@WAH?@AE"#; )8G! @"! @! AK"" :89M(" ?@! A"@?""@C#

?N"# /)%5P&9#0.#S&(>:8Y&%#-.#4&; 8#U.#51#&:"#7595%&:8=5; #M5%8); 8' #; 80' (&%<50#&9; #d1%8M (&08' #L&\*50eG#-# Z:89; 5; #5\* &:>8) 9#)R#915%#1%&15%#&<#55P591#&9; #; :898' &:#08<98R8' &9' 5"# "# #?@! AB! ?JD?FG! @JCH! @N"#; )8G! @"! @! AK"" :89M(" ?@! W"@J"@! N#

?I"# a:&&0059#2.#S&+5%#[-.#\ )L&:0Y8#, 7.#6P5%0) 9#, 7.#\$8%0' (#\_2##[3515' 18) 9#)R#5:5' 1%)<%&M(8' #058=>%50# L81(#) 9189>)>0#667#P) 981)%89<#9#%818' &::+#R::#M&185910"# " #?@@EBA?D! @FG! JECH! JEN"# ;)8G! @"! ?! ?K@! "Q]\_"@@@@! ?W! NE"NNJI J"A?#

C@"# 4%89Y&#6.#a) 'Y\$#.5\$50; )%RR5%#3.#51#&:"#[U6aV-\_# , 6UT, 4#-#; 5R89818) 9#&9; #' :&008R8' &18) 9#)R#01&1>0# 5M8:5M18' >0#f# , 5M)%1#)R#1 (5#\_ -6#4&0Y#/) %' 5#) 9#a:&008R8' &18) 9#)R#[1&1>0#6M8:5M18' >0#a) PP591g# \$801)%8' &:# " #?@! WBWAD! @FG! HI "#; )8G! @"! !!! K5M8"! C! ?! #

C! "# 0&>5%0' (P8; 1#-.# , >Z89)0#a.#a:&&0059#2#-MM%)&' (#1)#S&9<&89<#U5%8); 8' #380' (&%<50"# " #?@! NBCWDEFGC@I HC! C"#; )8G! @"! @I JKQ] U"@@@@@@@@@@@@@EAE#

C?"# \_5L80#3Q.#2) (90)9#6\_"#J%)<9)080#)R#U5%8); 8' #&9; #, (+1(P8' #J&115%90#89#-; >:1#&9; #U5; 8&1%8' #  
U)M>:&18)90"#

EA"## 7&01)9#46.#05Z89#6S.#a>115%#7, .#\_>#`.#[=&R:&%0Y8#2U"#W915%&'18)90#Z51L559#"&99&Z8;8):#&9;#  
' )PP)9:+#>05; #&9185M8:5M18' #; %><0"# "#?@! JBWNDI FG! WNAH! WI ?"#; )8G! @!"!!! K5M8"! CNW?#

EJ"## 4):5; &9)#S.#0#811)9#2Q.#S'\5)9##&.#51#&:"#h18:81+#)R#&9#8PP>9)1(5%&M+#1%8&:#89#5\* &:>189<#M&185910#  
L81(#M%50>P5; #&>1)8PP>95#5M8:5M0+"# "#?@! EBN?D! NFG! WJNH! WNA"#  
;)8G! @!"!?!?KQ]\_"@@@@@@@@@@@@CNC#

EN"## I >5Y#-S\_#0#811)9#2Q.#S'\5)9#-.#51#&:"#->1)8PP>95#6M8:5M0+"# "#?@! ?BAI DWFGWN?HWI C"#  
;)8G! @!"! @! K&%'(95>%):"?@!"! ?! I NW#

EI"## 38&=H-%&018&#, .#/%):#-0.#7&% 8&#Sa.#51#&:"#08:&15%&:#P5P)%+#; +0R>9'18)9#89#5M8:5M0+#0>%<5%+#  
' &9; 8; &150#; 515'15; #Z+#1(5#891%&' &%)18; #&P)Z&%Z81&:#M%)'5; >%5#DQ&; &#P5P)%+#1501F"#  
"#?@?BCD! FGN?HI !"#; )8G! @!"! @AK5Z5("?"@!"@?I N#

W@"## [(&%&9#-.#T)8#`a.#\_&9<R811#2.#[M5%:89<#S, "#W91%&' &%)18; #&P)Z&%Z81&:#M%)'5; >%5#R)%#5M8:5M0+#  
0>%<5%+"# "#?@!"! B?@D?FG?@IH?! C"#; )8G! @!"! @! AK^"+5Z5("?"@!"! @!"! C#

AC"## 7)9=&:5=HS&%1895=#2"#4(5#[15%5)H6:5'1%)59'5M(&.)<%&M(+G#4(5#6M8:5M1)<598'#j)95"#

JI"## \$5'Y#a] .#\89<H[15M(590#3.#S&005+#-3.#51#&:"#4L)H+5&%#058=>%5#%5; >'18)9#89#&; >:10#L81(#P5; 8' &.:+#  
891%&'1&Z:5#M&%18&:#)9051#5M8:5M0+#1%5&15; #L81(##50M)908\*5#95>%)018P>:&18)9G#/89&:#%50>:10#)R#1(5#  
, ] [# [+015P#U8\*)1&:#1%8&:# "#?@! EBWWDCFGEC?HEE! "#; )8G! @'!!!!K5M8"! ?WCE#

N@"## \89<H[15M(590#3.#S8%#)#6.#Q5Z5%#U0.#51#&:"#\_&15%&:8-&18)9#)R#P508&:#15PM)%&:#.)Z5#5M8:5M0+#L81(#  
'(%)98' #&PZ>:&1)%+#5:5'1%)')%18' )<%&M(+ "# "#?@! WBWADAFGI WI HI AJ"#; )8G! @'!!!!K5M8"! C@! @#

N!"## 05%<5+#7\.#S)%%5.:#S2.#S8=%&(8#6S.#51#&:"#\_)9<H15%P#1%5&1P591#L81(##50M)908\*5#Z%&89#018P>:&18)9#  
89#&; >:10#L81(##5R%&'1)%+#M&%18&:#058=>%50"# "#?@! WBNEDNFGN! @HN! J"#  
; )8G! @'!?!?KQ]\_"@@@@@@@@@@@@! ?N@#

N?"##

; )&! @"!?!?KQ]\_"@@@@@@@@@?@JA#

IW"# ]>L5%#S.#6P5%0)9.#5##)L5IW"#IQ#6IW"; (#959IW"#