Message

From: Miller, David [/O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=FA0582F5BA6540C687844F9289A4F74F-DAVID J. MILLER]
Sent: 9/22/2019 10:25:49 PM
To: DavidJ Miller [Miller.DavidJ@epa.gov]; David Miller [davjmiller@mac.com]
Subject: FW: graphs for example
Attachments: Stark.docx; Stata do file for the ankle reflex for acephate_v4.do

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From: Miller, David <Miller.DavidJ@epa.gov>
Sent: Sunday, September 22, 2019 5:16 PM
To: Miller, David <Miller.DavidJ@epa.gov>; David Miller <davjmiller@mac.com>
Subject: FW: graphs for example

From: Nguyen, James <Nguyen.James@epa.gov>
Sent: Sunday, September 22, 2019 11:33 AM
To: Miller, David <Miller.DavidJ@epa.gov>
Subject: RE: graphs for example

I finished the FDR adjustment for the multiple comparison of the ORs in Table 2 of Start article.

James

From: Nguyen, James
Sent: Sunday, September 22, 2019 10:37 AM
To: Miller, David <Miller.DavidJ@epa.gov>
Subject: RE: graphs for example

The purpose of plot is to investigate whether the Beta estimates are not consistent with the random sample:

- Number of Betas > 0 vs. Betas < 0
- If the estimates of Beta were randomly draw from a normal distribution, any values in the estimates are outliers (i.e. real effects)?

Thanks
James

From: Miller, David <Miller.DavidJ@epa.gov>
Sent: Saturday, September 21, 2019 6:36 PM
To: Nguyen, James <Nguyen.James@epa.gov>
Subject: FW: graphs for example

James,

Here is the data from Table 4 of Starks et al (2012) in *Neurotoxicology and Teratology*. This is one of the handouts I sent to you and others in TEB. I've also attached that handout it to this email as an MS Word document.

Table 4
Regression coefficients from linear regression models for neurobehavioral outcomes and ever used pesticides for the 701 male pesticide applicators.

Pesticide	CPT* (n = 692)		Digit-Symbol* (n = 691)		Finger Tapping, dominant (n = 685)		Grooved Pegboard, dominant* (n = 689)		AVLT Total Recall (n = 696)		AVLT Delayed Recall (n = 695)		AVLT Recognition (n = 694)		Sequences A* (n = 679)		Sequences B* (n = 671)	
	β	SE	β	SE	β	SE	β	SE	β	SE	β	SE	β	SE	β	SE	β	SE
Organophosphates																		
Acephate	1.08	3.55	−2.12	1.83	0.22	0.87	−0.04	2.12	−0.04	0.39	0.22	0.27	−0.02	0.25	−2.07	1.25	−1.36	1.83
Chlorpyrifos	−1.57	3.12	int	..	−0.64	0.78	**3.47***	1.53	0.54	0.34	0.37	0.19	0.17	0.18	−1.60	0.89	−0.55	1.30
Coumaphos	0.92	4.39	2.30	1.87	1.24	1.09	1.82	2.19	**1.25***	0.48	0.50	0.27	0.40	0.26	0.75	1.26	2.93	1.82
Diazinon	−1.61	3.07	0.37	1.32	0.71	0.79	0.60	1.54	0.16	0.33	0.19	0.19	−0.03	0.18	−0.74	0.89	0.78	1.30
Dichlorvos	−0.46	3.90	−0.47	1.78	0.30	0.94	0.97	2.05	0.51	0.43	0.18	0.26	0.17	0.24	1.53	1.18	1.34	1.72
Dimethoate	2.00	5.13	−1.58	2.17	−1.06	1.15	−0.71	2.53	0.84	0.56	0.21	0.32	0.55	0.30	1.98	1.45	1.42	2.11
Disulfoton	3.73	4.18	−1.97	1.93	−1.20	1.03	−2.08	2.24	−0.18	0.46	0.37	0.28	−0.30	0.27	**−2.55***	1.31	0.72	1.93
Ethoprop	1.51	3.99	**−3.66***	1.84	0.33	0.99	−1.33	2.15	**−0.86***	0.44	−0.23	0.27	−0.43	0.25	**−3.27****	1.25	−1.46	1.85
Fonofos	1.70	3.33	0.90	1.56	0.24	0.83	0.57	1.82	0.36	0.36	0.34	0.23	0.03	0.22	−0.73	1.05	−0.29	1.53
Malathion	−6.13	3.62	−2.68	1.53	0.30	0.81	int	-	0.58	0.39	0.24	0.22	−0.19	0.21	−0.91	1.04	0.20	1.51
Parathion	3.47	3.73	0.40	1.60	−0.33	0.85	0.61	1.86	−0.26	0.40	0.41	0.23	0.06	0.22	−0.65	1.08	0.62	1.58
Phorate	−1.54	3.20	0.24	1.40	−0.21	0.75	−0.99	1.64	0.22	0.35	0.25	0.21	0.33	0.19	−0.52	0.95	0.03	1.38
Phosmet	−2.83	4.35	−2.00	1.92	0.19	1.02	0.89	2.25	0.29	0.47	−0.15	0.28	−0.21	0.27	−0.15	1.29	0.00	1.86
Tebupirimfos	−0.04	5.04	2.35	2.23	0.23	1.19	−1.29	2.62	0.36	0.55	0.19	0.33	−0.03	0.31	−0.38	1.51	1.60	2.18
Terbufos	−0.62	3.02	0.78	1.33	1.21	0.70	−1.22	1.55	0.06	0.33	0.17	0.19	0.04	0.18	**−1.34***	0.90	−0.66	1.31
Tetrachlorvinphos	3.28	5.03	0.78	2.17	−1.28	1.16	−0.72	2.54	**1.34***	0.55	0.35	0.32	0.53	0.30	1.45	1.46	1.89	2.10
Carbamates																		
Aldicarb	−0.69	3.89	1.00	1.84	−0.51	0.97	2.00	2.12	0.25	0.47	0.30	0.27	**0.51***	0.25	−0.68	1.24	−0.01	1.81
Benomyl	3.56	4.06	2.64	1.85	−0.44	0.97	−1.29	2.13	0.56	0.47	0.44	0.27	0.28	0.25	2.27	1.24	−1.78	1.81
Carbaryl	int	-	0.48	1.48	0.49	0.79	−1.76	1.74	**0.83***	0.38	**0.56****	0.22	0.05	0.21	−0.31	1.01	1.00	1.46
Carbofuran	4.75	3.08	1.81	1.30	1.20	0.69	2.08	1.52	0.21	0.34	0.19	0.19	−0.07	0.18	−0.75	0.88	int	-

CPT = Continuous Performance Test, AVLT = Auditory Verbal Learning Test, int = significant interaction term for state by pesticide exposure; All models were adjusted for age (years) and AIQ score. In addition, CPT models were adjusted for positive affect score (PA) and caffeine consumption; Digit-Symbol models were adjusted for PA, education, state, and visual acuity score; Finger Tapping models were adjusted for PA and state; Grooved Pegboard models were adjusted for caffeine consumption, state and visual acuity score; AVLT Total Recall models were adjusted for negative affect score (NA), PA score, and education; AVLT Delayed Recall models were adjusted for NA, PA, education and state; AVLT Recognition models were adjusted for PA, education and state; Sequences A and B were adjusted for PA and state.

* Regression coefficients have been multiplied by −1 so that lower scores indicate poorer performance.

* $p < 0.05$.

** $p < 0.01$.

And here are the Beta/SE's (aka Standarized coefficients) for the 9 tests appearing in Table 4 (there is a problem in the Sequences B or _beta9se9 column)

```
. list class-pestid, clean sep(0)

                class            pesticide    _beta1~1    _beta2~2    _beta3~3    _beta4~4    _beta5~5    _beta6~6    _b
eta7~7    _beta8~8    _beta9~9    pestid
  1.               OP             Acephate         .48       -1.13        -.15         .02        -
.32          .8        -.36        -.33          1
  2.               OP         Chlorpyrifos        -.17       -1.36         -
.56        2.08        1.37           2          .6        -.49        -.49          2
  3.               OP            Coumaphos         .46        1.71        1.47        1.26        2.41        1.58
     .        3.05        3.05           3
  4.               OP             Diazinon        -.34         -
.53         .51         .03         .05         .23        -.17          .7          .7          4
  5.               OP           Dichlorvos        -.35         .16        -.11         -
.29         1.5        1.33        1.18          .6          .6           5
  6.               OP           Dimethoate         .48        -.54        -.18         -
.3        1.05         .33        1.85       -1.16       -1.16           6
  7.               OP           Disulfoton        1.13       -1.17       -1.15        -.87        -
.77        1.06       -1.41         .28         .28           7
  8.               OP             Ethoprop         .84       -1.52         .08        -.37       -2.14        -
1.06       -1.69        -.97        -.97           8
  9.               OP              Fonofos         .39         .44         .16         .78        -
1.23        1.86        -.38        -.53        -.53           9
 10.               OP            Malathion        -.5         -
2.33         .28           .          .7         .91          -1         .16         .16          10
 11.               OP            Parathion           2         .35       -1.13         -
.09          .4        2.33        1.43         .03         .03          11
 12.               OP              Phorate        -.13         .99        -.91         -
.52         .86        1.75        2.08         .28         .28          12
 13.               OP              Phosmet        -.55        -.97         .33         .33         .41        -
.94        -.75        -.01        -.01          13
 14.               OP         Tebupirimfos        -.14        1.09         .11         -
.7           1           1           0        1.01        1.01          14
 15.               OP             Terbufos        -.14         .69        1.76         -
1.2         .24          .6          .4        -.47        -.47          15
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 16.                OP   Tetrachlorvinphos        .75        .34      -1.07       -
.27       2.24         .9       1.89        .89        .89       16
 17.        Carbamate            Aldicarb        .46       1.06       -
.46       1.53       1.11        1.8          2        .72        .72       17
 18.        Carbamate             Benomyl        .95       1.75      -.05       -
.01       1.94       2.28       1.59       1.34       1.34       18
 19.        Carbamate            Carbaryl        .37       -.05      -.27       -
.81        .95       2.08        .33        .36        .36       19
 20.        Carbamate          Carbofuran        .79        .82       1.43       1.56        .95       1.75
   .45       -.52       -.52        20
 21.          All OPs             All OPs       -.44      -1.31      -.33       -
.86        .43       1.14       -.38        .18        .18       21
 22.   All Carbamates      All Carbamates        .76      -1.09        .6       -
.08       1.26       2.84        .56       -.77       -.77       22
```

And some summary information for these standardized coefficients:

```
. univar _beta1se1-_beta9se9
                                          -------------- Quantiles --------------
Variable        n      Mean      S.D.      Min       .25       Mdn       .75       Max
-------------------------------------------------------------------------------
_beta1se1      22      0.32      0.64    -0.55     -0.17      0.42      0.76      2.00
_beta2se2      22     -0.12      1.14    -2.33     -1.13      0.05      0.82      1.75
_beta3se3      22      0.02      0.80    -1.15     -0.46     -0.08      0.33      1.76
_beta4se4      21      0.06      0.90    -1.20     -0.52     -0.09      0.33      2.08
_beta5se5      22      0.66      1.08    -2.14      0.24      0.91      1.26      2.41
_beta6se6      22      1.21      0.98    -1.06      0.80      1.24      1.86      2.84
_beta7se7      21      0.39      1.14    -1.69     -0.38      0.40      1.43      2.08
_beta8se8      22      0.20      0.92    -1.16     -0.49      0.17      0.70      3.05
_beta9se9      22      0.20      0.92    -1.16     -0.49      0.17      0.70      3.05
-------------------------------------------------------------------------------
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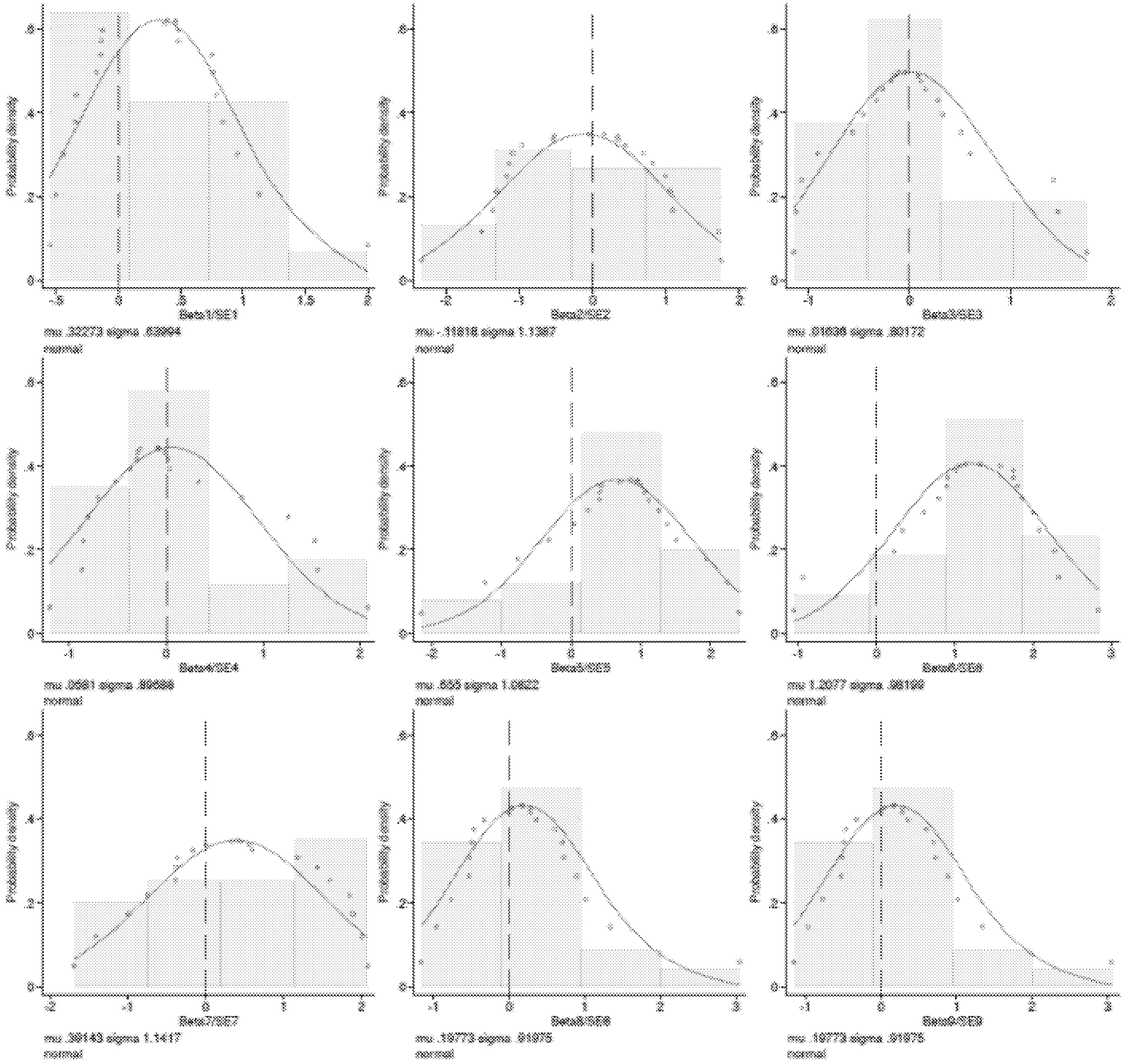
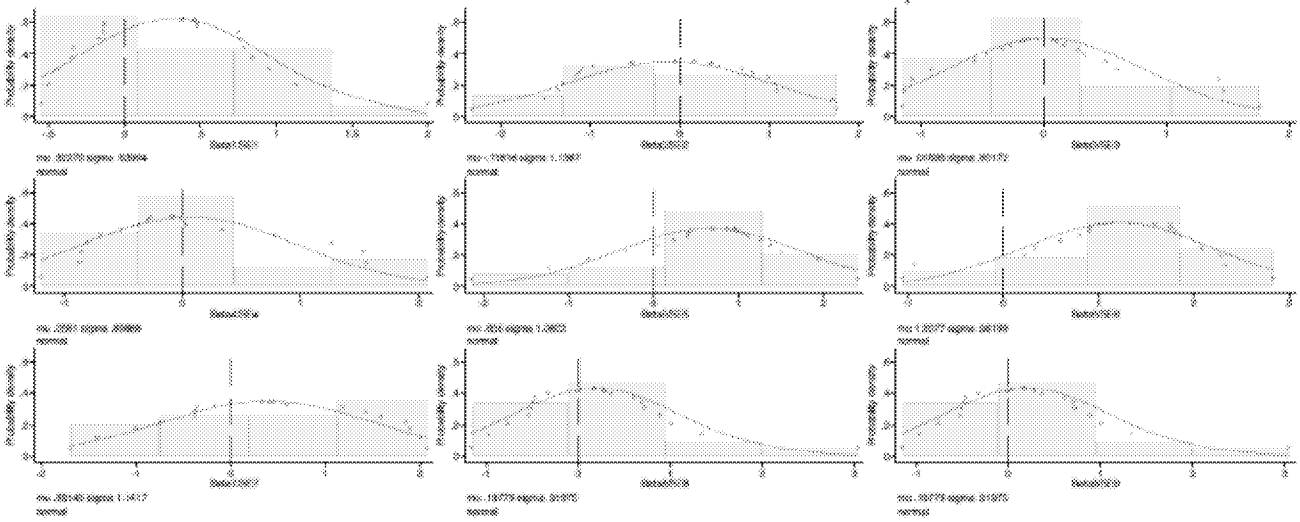
See attached and below:

DP Plots of Beta/SE values for NB outcomes and ever-used pesticides in AHS



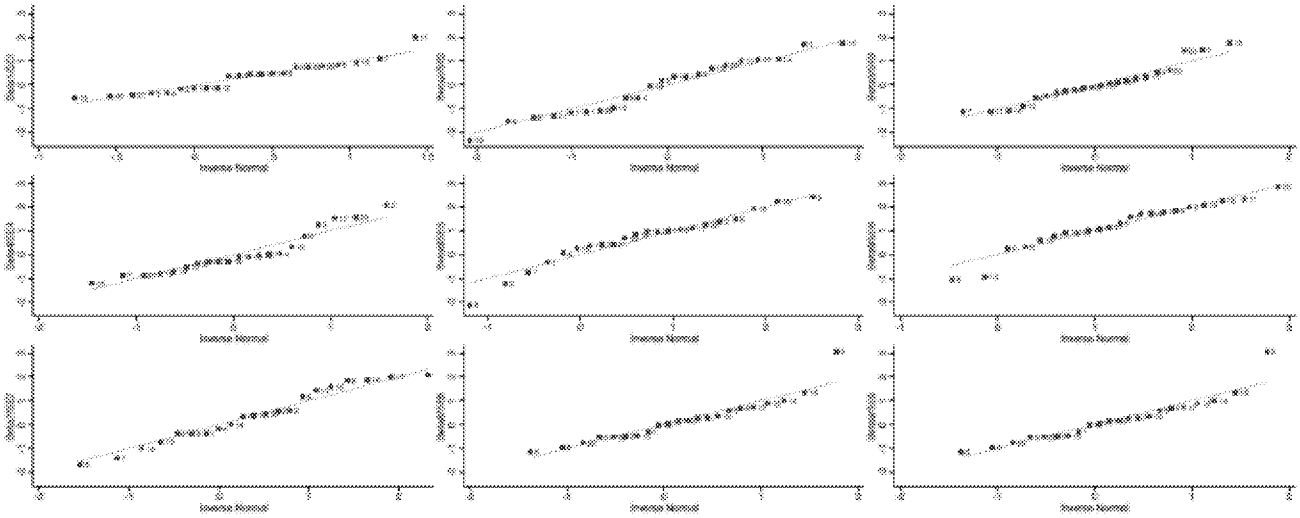
Source: Table 4 Starks et al., 2012. Neurobehavioral function and OP insecticide use among pesticide applicators in the AHS, Neurotox& Teratol.

DP Plots of Beta/SE values for NB outcomes and ever-used pesticides in AHS



Source: Table 4 Starks et al., 2012. Neurobehavioral function and OP insecticide use among pesticide applicators in the AHS. Neurotoxicol. Teratol.

Quantile-Normal Plots of Beta/SE values for NB outcomes and ever-used pesticides in AHS



Source: Table 4 Starks et al., 2012. Neurobehavioral function and OP insecticide use among pesticide applicators in the AHS. Neurotoxicol. Teratol.