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## **Supplemental Information**

### **A circuit logic for sexually shared and dimorphic aggressive behaviors in *Drosophila***

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**Table S1. Genotypes of flies used in each experiment. Related to all figures.**

Figure	Abbreviation	Genotypes
<b>Figure 1</b>	<b>Abbreviation</b>	<b>Genotypes</b>
1B-C		Canton-S
<b>Figure 2</b>	<b>Abbreviation</b>	<b>Genotypes</b>
2B		Eb5-Gal4(attp40) x 20xUAS-CshChrimson-mVenus(attp2)
2C	Eb5>CshChr Eb5>GFP	Eb5-Gal4(attp40) x 20xUAS-CshChrimson-mVenus(attp2) Eb5-Gal4(attp40) x pJFRC82-20xUAS-IVS-Syn21-GFP-p10(attp2)
2D-ii & 2Ei		Eb5-Gal4(attp2) x UAS-C3PA-GFP (iii)
2Diii-v	CAP driver	Eb5-Gal4(attp40); 22F05-Gal80(attp2) x 20xUAS-CsChrimson-mVenus(attp2)
2Eii	pC1 driver	NP2631; dsx-Flp x 20xUAS-FRT-myrTopHat2-FRT-Chrimson::tdT3.1(vk5)
2Eiii	MAP driver	Eb5-AD(vk27); 22F05-DBD(attp2) x 20xUAS-CsChrimson-mVenus(attp2)
<b>Figure 3</b>	<b>Abbreviation</b>	<b>Genotypes</b>
3Ai, 3Aiii, & 3B	CAP>CshChr (tester) CAP>GFP (control)	Eb5-Gal4(attp40); 22F05-Gal80(attp2) x 20xUAS-CsChrimson-mVenus(attp2) Eb5-Gal4(attp40); 22F05-Gal80(attp2) x pJFRC82-20xUAS-IVS-Syn21-GFP-p10(attp2)
3Aii	MAP>CshChr (tester) MAP>GFP (control)	Eb5-AD(vk27); 22F05-DBD(attp2) x 20xUAS-CsChrimson-mVenus(attp2) Eb5-AD(vk27); 22F05-DBD(attp2) x pJFRC82-20xUAS-IVS-Syn21-GFP-p10(attp2)
3C	CAP>Kir2.1 (tester) CAP>GFP (control)	Eb5-Gal4(attp40); 22F05-Gal80(attp2) x pJFRC49-10xUAS-eGFP::Kir2.1(attp2) Eb5-Gal4(attp40); 22F05-Gal80(attp2) x pJFRC81-10xUAS-IVS-Syn21-GFP-p10 (attp2)
<b>Figure 4</b>	<b>Abbreviation</b>	<b>Genotypes</b>
4A	CAP>CshChr (tester)	Eb5-Gal4(attp40); 22F05-Gal80(attp2) x 20xUAS-CsChrimson-mVenus(attp2)
4B	CAP>GFP (control)	Eb5-Gal4(attp40); 22F05-Gal80(attp2) x pJFRC82-20xUAS-IVS-Syn21-GFP-p10(attp2)
		Eb5LexA(attp18); 20xUAS-IVS-Syn21-Chrimson::tdT3.1(su(Hw)attp5); 13xLexAop-IVS-jGCaMP7b(vk5) x Eb5-Gal4(attp40); 22F05-Gal80(attp2)
<b>Figure 5</b>	<b>Abbreviation</b>	<b>Genotypes</b>
5A & 5D	CAP>CshChr (tester) CAP>GFP (control)	Eb5-Gal4(attp40); 22F05-Gal80(attp2) x 20xUAS-CsChrimson-mVenus(attp2) Eb5-Gal4(attp40); 22F05-Gal80(attp2) x pJFRC82-20xUAS-IVS-Syn21-GFP-p10(attp2)
	MAP>CshChr (tester) MAP>GFP (control)	Eb5-AD(vk27); 22F05-DBD(attp2) x 20xUAS-CsChrimson-mVenus(attp2) Eb5-AD(vk27); 22F05-DBD(attp2) x pJFRC82-20xUAS-IVS-Syn21-GFP-p10(attp2)
5B	MAP>Kir2.1 (tester) MAP>GFP (control)	Eb5-AD(vk27); 22F05-DBD(attp2) x pJFRC49-10xUAS-eGFP::Kir2.1(attp2) Eb5-AD(vk27); 22F05-DBD(attp2) x pJFRC81-10xUAS-IVS-Syn21-GFP-p10 (attp2)
5C	CAP>MAP>CHR+MAP>Kir2.1 CAP>MAP>CHR+Empty>Kir2.1	Eb5-LexA(attp18);+; Eb5-AD(vk27); 22F05-DBD(attp2) x 13xLexAop2-IVS-Syn21-Chrimson-tdTomato-3.1(su(Hw)attp5); pJFRC49-10xUAS-eGFP::Kir2.1(attp2) Eb5-LexA(attp18);BDP-AD(attp40); BDP-DBD(attp2) x 13xLexAop2-IVS-Syn21-Chrimson-tdTomato-3.1(su(Hw)attp5); pJFRC49-10xUAS-eGFP::Kir2.1(attp2)
<b>Figure 6</b>	<b>Abbreviation</b>	<b>Genotypes</b>
6Ai	MAP neurons	Eb5-AD(vk27); 22F05-DBD(attp2) x 20xUAS-CsChrimson-mVenus(attp2)
6Aii	CAP(Chrimson)->MAP(jG7b)	Eb5LexA(attp18); 20xUAS-IVS-Syn21-Chrimson::tdT3.1(su(Hw)attp5); 13xLexAop-IVS-jGCaMP7b(vk5) x Eb5-Gal4(attp40); 22F05-Gal80(attp2)
6Bi	fpC1 neurons	26E01-AD(attp40); dsx-DBD x 20xUAS-CsChrimson-mVenus(attp2)
6Bii	CAP(Chrimson)->fpC1(jG7b)	Eb5LexA(attp18); 13xLexAop2-Chrimson::tdT3.1(su(Hw)attp5); 20xUAS-jGCaMP7b(vk5) x 26E01-AD(attp40); dsx-DBD
6C	fpC1-Chrimson	dsx-Flp x 26E01-Gal4(attp2) x 20xUAS-FRT-myrTopHat2-FRT-Chrimson::tdT3.1(vk5)
6Cii	fpC1>STOP	dsx-Flp x BDPGal4U(attp2); 20xUAS-FRT-myrTopHat2-FRT-Chrimson::tdT3.1(vk5)
6D	fpC1>Kir2.1 fpC1>GFP	26E01-AD(attp40); dsx-DBD x pJFRC49-10xUAS-eGFP::Kir2.1(attp2) 26E01-AD(attp40); dsx-DBD x pJFRC81-10xUAS-IVS-Syn21-GFP-p10 (attp2)
6E	CAP>Chrimson+ fpC1>Kir2.1 CAP>Chrimson+ Empty>Kir2.1	Eb5LexA(attp18); 13xLexAop2-IVS-Syn21-Chrimson::tdT3.1(su(Hw)attp5); pJFRC49-10xUAS-eGFP::Kir2.1(attp2) x 26E01-AD(attp40); dsx-DBD Eb5LexA(attp18); 13xLexAop2-IVS-Syn21-Chrimson::tdT3.1(su(Hw)attp5); pJFRC49-10xUAS-eGFP::Kir2.1(attp2) x BDP-AD(attp40); BDP-DBD(attp2)
<b>Figure 7</b>	<b>Abbreviation</b>	<b>Genotypes</b>
7Ai	CAP->MAP	Eb5LexA(attp18); 20xUAS-IVS-Syn21-Chrimson::tdT3.1(su(Hw)attp5); 13xLexAop-IVS-jGCaMP7b(vk5) x Eb5-Gal4(attp40); 22F05-Gal80(attp2)
7Aii	CAP->fpC1	Eb5LexAop2-Chrimson::tdT3.1(su(Hw)attp5); 20xUAS-jGCaMP7b(vk5) x 26E01-AD(attp40); dsx-DBD
7B & 7C	CAP>CshChrimson CAP>GFP	Eb5-Gal4(attp40); 22F05-Gal80(attp2) x 20xUAS-CsChrimson-mVenus(attp2) Eb5-Gal4(attp40); 22F05-Gal80(attp2) x pJFRC82-20xUAS-IVS-Syn21-GFP-p10(attp2)
<b>Figure S1</b>	<b>Abbreviation</b>	<b>Genotypes</b>
S1A & S1C	Wild-type approach	Canton-S
S1B	CAP-induced approach	Eb5-Gal4(attp40); 22F05-Gal80(attp2) x 20xUAS-CsChrimson-mVenus(attp2)
S1D	Wild-type approach	Canton-S
<b>Figure S2</b>	<b>Abbreviation</b>	<b>Genotypes</b>
S2A	R60G08>CsChrimson BDP>CsChrimson	R60G08-Gal4(attp2) x 20xUAS-CsChrimson-mVenus(attp2) BDPG4U(attp2) x 20xUAS-CsChrimson-mVenus(attp2)
S2B		R60G08-Gal4(attp2) x 20xUAS-CsChrimson-mVenus(attp2)
S2C	R60G08+FlpON R60G08+oldFlp+FlpON R60G08+FlpOFF R60G08+oldFlp+FlpOFF	R60G08-Gal4(attp2) x 20xUAS-FRT-myrTopHat2-FRT-Chrimson::tdT3.1(vk5) R60G08-Gal4(attp2) x old-Flp(attp40); 20xUAS-FRT-myrTopHat2-FRT-Chrimson::tdT3.1(vk5) R60G08-Gal4(attp2) x 20xUAS-FRT-Chrimson::tdT3.1-FRT-myrTopHat2(vk5) R60G08-Gal4(attp2) x old-Flp(attp40); 20xUAS-FRT-Chrimson::tdT3.1-FRT-myrTopHat2(vk5)
<b>Figure S3</b>	<b>Abbreviation</b>	<b>Genotypes</b>
S3A	Eb2-Gal4(attp2) Eb3-Gal4(attp2) Eb4-Gal4(attp2) Eb5-Gal4(attp2)	Eb2-Gal4(attp40) x 20xUAS-CshChrimson-mVenus(attp2) Eb3-Gal4(attp40) x 20xUAS-CshChrimson-mVenus(attp2) Eb4-Gal4(attp40) x 20xUAS-CshChrimson-mVenus(attp2) Eb5-Gal4(attp40) x 20xUAS-CshChrimson-mVenus(attp2)
S3B	60G08 neurons Eb5 neurons 60G08+Eb5- neurons	R60G08-Gal4(attp2) x 20xUAS-IVS-Syn21-Chrimson-tdTomato-3.1(su(Hw)attp5) Eb5-Gal4(attp2) x 20xUAS-CsChrimson-mVenus(attp2) R60G08-Gal4(attp2) x 20xUAS-IVS-Syn21-Chrimson-tdTomato-3.1(su(Hw)attp5); Eb5-Gal80(attp2)
S3C-ii	Eb5 vs dsx-Gal4	Eb5LexA(attp18); 20xUAS-Chrimson::tdT3.1(su(Hw)attp5); 13xLexAop-jGCaMP7b(vk5) x dsx-Gal4
S3Ciii	Eb5 vs FruM	Eb5LexA(attp18) x 13xLexAop2-CsChrimson::tdT3.1(vk5)
S3Eii	CAP vs Eb5	Eb5LexA(attp18); 10xUAS-nls::tdTomato(vk22); 13xLexAop2-nls::GFP(vk40) x Eb5-Gal4(attp40); 22F05-Gal80(attp2)
S3Eiii-iv	MAN vs Eb5	Eb5LexA(attp18); 10xUAS-nls::tdTomato(vk22); 13xLexAop2-nls::GFP(vk40) x Eb5-AD(vk27); 22F05-DBD(attp2)
<b>Figure S4</b>	<b>Abbreviation</b>	<b>Genotypes</b>
S4Ai	MAP	Eb5-AD(vk27); 22F05-DBD(attp2) x 20xUAS-CsChrimson-mVenus(attp2)
S4Aii	MAP>CshChr MAP>GFP(control)	Eb5-AD(vk27); 22F05-DBD(attp2) x 20xUAS-CsChrimson-mVenus(attp2) Eb5-AD(vk27); 22F05-DBD(attp2) x pJFRC82-20xUAS-IVS-Syn21-GFP-p10(attp2)
S4B	Eb5-Gal4 CAP MAP fpC1	Eb5-Gal4(attp40) x 20xUAS-CsChrimson-mVenus(attp2) Eb5-Gal4(attp40); 22F05-Gal80(attp2) x 20xUAS-CsChrimson-mVenus(attp2) Eb5-AD(vk27); 22F05-DBD(attp2) x 20xUAS-CsChrimson-mVenus(attp2) 26E01-AD(attp40); dsx-DBD x 20xUAS-CsChrimson-mVenus(attp2)
S4D		NP2631; Eb5-AD(vk27); 22F05-LexADB(attp2) x 10xUAS-nls::tdTomato(vk22); 13xLexAop2-nls::GFP(vk40)
S4Ei	fpC1>CsChrimson	26E01-AD(attp40); dsx-DBD x 20xUAS-CsChrimson-mVenus(attp2)
S4Eii	fpC1+FlpON fpC1+oldFlp+FlpON fpC1+FlpOFF fpC1+oldFlp+FlpOFF	26E01-AD(attp40); dsx-DBD x 20xUAS-FRT-myrTopHat2-FRT-Chrimson::tdT3.1(vk5) 26E01-AD(attp40); dsx-DBD x old-Flp(attp40); 20xUAS-FRT-myrTopHat2-FRT-Chrimson::tdT3.1(vk5) 26E01-AD(attp40); dsx-DBD x 20xUAS-FRT-Chrimson::tdT3.1-FRT-myrTopHat2(vk5) 26E01-AD(attp40); dsx-DBD x old-Flp(attp40); 20xUAS-FRT-Chrimson::tdT3.1-FRT-myrTopHat2(vk5)
S4F	MAP>GCaMP7b fpC1>GCaMP7b	Eb5LexA(attp18); 20xUAS-IVS-Syn21-Chrimson::tdT3.1(su(Hw)attp5); 13xLexAop-IVS-jGCaMP7b(vk5) x Eb5-Gal4(attp40); 22F05-Gal80(attp2) Eb5LexA(attp18); 13xLexAop2-Chrimson::tdT3.1(su(Hw)attp5); 20xUAS-jGCaMP7b(vk5) x 26E01-AD(attp40); dsx-DBD
<b>Figure S5</b>	<b>Abbreviation</b>	<b>Genotypes</b>
S5A	Eb5>CshChr (tester)	Eb5-Gal4(attp40) x 20xUAS-CsChrimson-mVenus(attp2)
S5B	CAP>CshChr (tester) CAP>GFP (control)	Eb5-Gal4(attp40); 22F05-Gal80(attp2) x 20xUAS-CsChrimson-mVenus(attp2) Eb5-Gal4(attp40); 22F05-Gal80(attp2) x pJFRC82-20xUAS-IVS-Syn21-GFP-p10(attp2)
S5C-ii	CAP>Kir2.1 (tester) CAP>GFP (control)	Eb5-Gal4(attp40); 22F05-Gal80(attp2) x pJFRC49-10xUAS-eGFP::Kir2.1(attp2) Eb5-Gal4(attp40); 22F05-Gal80(attp2) x pJFRC81-10xUAS-IVS-Syn21-GFP-p10 (attp2)
S5Ciii	MAP>Kir2.1 (tester) MAP>GFP(control)	Eb5-AD(vk27); 22F05-DBD(attp2) x pJFRC49-10xUAS-eGFP::Kir2.1(attp2) Eb5-AD(vk27); 22F05-DBD(attp2) x pJFRC81-10xUAS-IVS-Syn21-GFP-p10 (attp2)
S5Ciii	fpC1>Kir2.1 (tester) fpC1>GFP (control)	26E01-AD(attp40); dsx-DBD x pJFRC49-10xUAS-eGFP::Kir2.1(attp2) 26E01-AD(attp40); dsx-DBD x pJFRC81-10xUAS-IVS-Syn21-GFP-p10 (attp2)
S5D	MAP>CshChr fpC1>CshChr	Eb5-AD(vk27); 22F05-DBD(attp2) x 20xUAS-CsChrimson-mVenus(attp2) 26E01-AD(attp40); dsx-DBD x 20xUAS-CsChrimson-mVenus(attp2)
<b>Figure S6</b>	<b>Abbreviation</b>	<b>Genotypes</b>
S6A		Eb5LexA(attp18); 20xUAS-IVS-Syn21-Chrimson::tdT3.1(su(Hw)attp5); 13xLexAop-IVS-jGCaMP7b(vk5) x Eb5-Gal4(attp40); 22F05-Gal80(attp2)
S6B		Eb5-AD(vk27); 22F05-DBD(attp2) x 20xUAS-IVS-Syn21-Chrimson::tdT3.1(su(Hw)attp5); 20xUAS-IVS-jGCaMP7b(vk5)
S6C		26E01-AD(attp40); dsx-DBD x 20xUAS-IVS-Syn21-Chrimson::tdT3.1(su(Hw)attp5); 20xUAS-IVS-jGCaMP7b(vk5)
<b>Figure S7</b>	<b>Abbreviation</b>	<b>Genotypes</b>
S7A	Eb5>Chrimson + tk>Kir2.1 Eb5>Chrimson + Empty>Kir2.1	tk-Gal4; Eb5LexA(attp40) x 13xLexAop2-Chrimson::tdT3.1(su(Hw)attp5); 10xUAS-eGFP::Kir2.1(attp2) Eb5LexA(attp40) x 13xLexAop2-Chrimson::tdT3.1(su(Hw)attp5); 10xUAS-eGFP::Kir2.1(attp2)
S7B	tk>Chrimson + Eb5 > Kir2.1 tk>Chrimson + Empty > Kir2.1	tk-Gal4; Eb5LexA(attp40) x 13xLexAop2-eGFP::Kir2.1(attp40); 20xUAS-Chrimson::tdT3.1(vk5) tk-Gal4 x 13xLexAop2-eGFP::Kir2.1(attp40); 20xUAS-Chrimson::tdT3.1(vk5)

**Table S2. Behavioral classifier performance. Related to Figure 1.**

Classifiers	Performance		No. of training frames			
	Precision (%) = TP/(TP+FP)	Recall (%) = TP/(TP+FN)	True Positive (TP)	True Negative (TN)	False Positive (FP)	False Negative (FN)
<b>Approach</b>	92.2	89.6	879 (92.2%)	1431 (93.3%)	74 (7.8%)	102 (6.7%)
<b>Lunging</b>	94.4	87.1	304 (94.4%)	1388(96.9%)	18(5.6%)	45(3.1%)
<b>Headbutting</b>	78.4	89.9	1344 (78.4%)	1147(88.4%)	371(21.6%)	151 (11.6%)

**Precision (TP/(TP+FP)):** percentage of the detected behavioral frames that were true positives

**Recall (TP/(TP+FN)):** percentage of the true behavioral frames that were detected

**True Positive (TP):** percentage of the frames in which animals displayed certain behavior and were correctly detected by the classifier

**True Negative (TN):** percentage of the frames in which animals did not display certain behavior and were correctly distinguished by the classifier

**False Positive (FP):** percentage of the frames in which animals did not display certain behavior but were incorrectly detected by the classifier

**False Negative (FN):** percentage of the frames in which animals displayed certain behavior but were not detected by the classifier

**Table S3. Statistical parameters of each experiment. Related to all figures.**

Figure	Comparisons (Group 1 (G1) vs Group 2 (G2))	N number	Methods	p value	U value	W value	z value	signedrank	tstat	df	sd			
Figure 1	1Bi Group-housed (GH) males vs GH females Single-housed (SH) males vs SH females GH males vs SH males GH females vs SH females	8 pairs vs 8 pairs	Mann-Whitney U-test	0.006993	8	44								
		8 pairs vs 8 pairs		2.95-03	5	95								
		8 pairs vs 8 pairs		1.55E-04	0	36								
		8 pairs vs 8 pairs		3.11E-04	1	37								
	1Bii Group-housed (GH) males vs GH females Single-housed (SH) males vs SH females GH males vs SH males GH females vs SH females	8 pairs vs 8 pairs	Mann-Whitney U-test	2	32	68								
		8 pairs vs 8 pairs		1.55E-04	0	100								
		8 pairs vs 8 pairs		1.55E-04	0	36								
		8 pairs vs 8 pairs		1	28	64								
	1Biii Group-housed (GH) males vs GH females Single-housed (SH) males vs SH females GH males vs SH males GH females vs SH females	8 pairs vs 8 pairs	Mann-Whitney U-test	1.40E-03	4	40								
		8 pairs vs 8 pairs		1.55E-04	0	36								
		8 pairs vs 8 pairs		1	28	64								
		8 pairs vs 8 pairs		1.55E-04	0	36								
1Ci No Food males vs No Food females Food males vs Food females No Food males vs Food males No Food females vs Food females	8 pairs vs 8 pairs	Mann-Whitney U-test	0.025641	12	48									
	12 pairs vs 12 pairs		9.53E-04	15		3.304								
	8 pairs vs 12 pairs		0.047869	28		1.9785								
	8 pairs vs 12 pairs		4.97E-04	2.5		3.4823								
1Cii No Food males vs No Food females Food males vs Food females No Food males vs Food males No Food females vs Food females	8 pairs vs 8 pairs	Mann-Whitney U-test	2	32	68									
	12 pairs vs 12 pairs		1.64E-02	42		2.3993								
	8 pairs vs 12 pairs		0.047869	28		1.9785								
	8 pairs vs 12 pairs		2	48		-Inf								
1Ciii No Food males vs No Food females Food males vs Food females No Food males vs Food males No Food females vs Food females	8 pairs vs 8 pairs	Mann-Whitney U-test	0.025641	12	48									
	12 pairs vs 12 pairs		1.02E-05	0		4.4136								
	8 pairs vs 12 pairs		2	48		-Inf								
	8 pairs vs 12 pairs		7.57E-03	13		2.6708								
<b>Figure 2</b>														
Comparisons (Group 1 (G1) vs Group 2 (G2))														
2Ci	Eb5 > GFP vs Eb5 > CsChR During Stimulation Eb5 > CsChR Before vs During Stimulation	16 pairs vs 16 pairs	Mann-Whitney U-test Wilcoxon signed-rank test	1.45E-06	0		4.8182							
		16 pairs		4.37E-04		-3.517	0							
		16 pairs vs 16 pairs		5.18E-07	0	5.0197								
		16 pairs		4.38E-04		-3.516	0							
2Cii	Eb5 > GFP vs Eb5 > CsChR During Stimulation Eb5 > CsChR Before vs During Stimulation	16 pairs vs 16 pairs	Mann-Whitney U-test Wilcoxon signed-rank test	1.98E-05	15		4.2671							
		16 pairs		2.41E-04		-3.672	13.5							
		16 pairs vs 16 pairs		2.30E-05	16	4.2335								
		16 pairs		7.83E-04		-3.359	19							
<b>Figure 3</b>														
Comparisons (Group 1 (G1) vs Group 2 (G2))														
3Ai	(Male) CAP > GFP vs CAP > CsChR During Stimulation (Male) CAP > CsChR Before vs During Stimulation (Female) CAP > GFP vs CAP > CsChR During Stimulation (Female) CAP > CsChR Before vs During Stimulation	16 pairs vs 16 pairs	Mann-Whitney U-test Wilcoxon signed-rank test	2.90E-06	2		4.6777							
		16 pairs		7.51E-04		-3.37	3							
		16 pairs vs 16 pairs		1.26E-06	0	4.8459								
		16 pairs		2.63E-04		-3.007	10							
3Aii	(Male) MAP > GFP vs MAP > CsChR During Stimulation (Male) MAP > CsChR Before vs During Stimulation	16 pairs vs 16 pairs	Mann-Whitney U-test Wilcoxon signed-rank test	0.71463	133.5		0.3657							
		16 pairs		0.1942		74								
		16 pairs vs 16 pairs		0.1789	240.5	0	1.3442							
		16 pairs		0.1789	16 pairs	0	1.3442	115						
3Bi	(Fly vs Magnet target-Male tester) CAP > GFP vs CAP > CsChR (Fly vs Magnet target-Female tester) CAP > GFP vs CAP > CsChR	12 flies vs 12 flies	Mann-Whitney U-test	0.02623	35.5		2.2228							
		8 flies vs 8 flies		0.028594	11.5	47.5								
		15 flies vs 15 flies		1.99E-03	39	3.0922								
		15 flies vs 15 flies		2.73E-04	23	3.6399								
3Bii	(Male vs Female target-Male tester) CAP > GFP vs CAP > CsChR (Male vs Female target-Female tester) CAP > GFP vs CAP > CsChR (Male vs Female target-Male tester) CAP > CsChR vs (Male vs Female target-Female tester) CAP > CsChR	15 flies vs 15 flies	Mann-Whitney U-test	1.30E-04	20		3.8262							
		16 flies vs 16 flies		0.061547	78	1.8695								
		16 flies vs 16 flies		0.36396	105	0.8489								
		16 flies vs 16 flies		0.18283	90.5	1.3963								
3Biii	(Female vs Female target-Male tester) CAP > GFP vs CAP > CsChR (Female vs Female target-Female tester) CAP > GFP vs CAP > CsChR (Male vs Female target-Male tester) CAP > CsChR vs (Female vs Female target-Male tester) CAP > CsChR (Male vs Female target-Female tester) CAP > CsChR vs (Female vs Female target-Female tester) CAP > CsChR	16 flies vs 16 flies	Mann-Whitney U-test	0.03612	72		2.0956							
		15 flies vs 16 flies		2.43E-02	68	2.2522								
		15 flies vs 16 flies		9.22E-06	6	4.4347								
		13 pairs vs 16 pairs		1.02E-04	15	3.8853								
3Ci	(Male-Approach > attack) CAP > GFP vs CAP > Kir2.1 (Male-Approach) CAP > GFP vs CAP > Kir2.1 (Male-Lunge) CAP > GFP vs CAP > Kir2.1	13 pairs vs 16 pairs	Mann-Whitney U-test	9.22E-06	6		4.4347							
		13 pairs vs 16 pairs		1.02E-04	15	3.8853								
		13 pairs vs 16 pairs		9.19E-06	6	4.4353								
		16 pairs vs 16 pairs		4.43E-04	45.5	3.513								
3Cii	(Female-Approach > attack) CAP > GFP vs CAP > Kir2.1 (Female-Approach) CAP > GFP vs CAP > Kir2.1 (Female-Headbutt) CAP > GFP vs CAP > Kir2.1	16 pairs vs 16 pairs	Mann-Whitney U-test	1.25E-04	28.5		3.737							
		16 pairs vs 16 pairs		3.92E-04	33.5	3.5454								
		16 pairs vs 16 pairs												
		16 pairs vs 16 pairs												
<b>Figure 4</b>														
Comparisons (Group 1 (G1) vs Group 2 (G2))														
4Ai	(Stim 1-Female-Approach) CAP > GFP vs CAP > CsChR (Stim 2-Female-Approach) CAP > GFP vs CAP > CsChR (Stim 3-Female-Approach) CAP > GFP vs CAP > CsChR (Stim 4-Female-Approach) CAP > GFP vs CAP > CsChR (Stim 5-Female-Approach) CAP > GFP vs CAP > CsChR	16 pairs vs 16 pairs	Mann-Whitney U-test	7.95E-05	29		3.946							
		16 pairs vs 16 pairs		5.88E-04	40.5	3.4372								
		16 pairs vs 16 pairs		9.33E-07	0	4.9053								
		16 pairs vs 16 pairs		1.38E-06	2.5	4.8285								
		16 pairs vs 16 pairs		2.08E-06	4	4.745								
		4Aii		(Stim 1-Male-Approach) CAP > GFP vs CAP > CsChR (Stim 2-Male-Approach) CAP > GFP vs CAP > CsChR (Stim 3-Male-Approach) CAP > GFP vs CAP > CsChR (Stim 4-Male-Approach) CAP > GFP vs CAP > CsChR (Stim 5-Male-Approach) CAP > GFP vs CAP > CsChR	15 pairs vs 15 pairs	Mann-Whitney U-test	0.83118	113.5		0.2132				
					15 pairs vs 15 pairs		0.12287	76	1.5437					
					15 pairs vs 15 pairs		9.94E-03	50.5	2.578					
					15 pairs vs 15 pairs		2.98E-06	0.5	4.6723					
					15 pairs vs 15 pairs		3.00E-06	0	4.6711					
					16 pairs vs 16 pairs		0.14251	98	1.4665					
		4Aiii		(Stim 1-Female-Headbutt) CAP > GFP vs CAP > CsChR (Stim 2-Female-Headbutt) CAP > GFP vs CAP > CsChR (Stim 3-Female-Headbutt) CAP > GFP vs CAP > CsChR (Stim 4-Female-Headbutt) CAP > GFP vs CAP > CsChR (Stim 5-Female-Headbutt) CAP > GFP vs CAP > CsChR	16 pairs vs 16 pairs	Mann-Whitney U-test	0.1213	90.5		1.5493				
16 pairs vs 16 pairs	0.018327		33.5		3.741									
16 pairs vs 16 pairs	3.03E-05		25.5		4.1713									
16 pairs vs 16 pairs	1.01E-06		8		4.8896									
15 pairs vs 15 pairs	2		112		-Inf									
15 pairs vs 15 pairs	2		112.5		-Inf									
4Aiv	(Stim 1-Male-Lunge) CAP > GFP vs CAP > CsChR (Stim 2-Male-Lunge) CAP > GFP vs CAP > CsChR (Stim 3-Male-Lunge) CAP > GFP vs CAP > CsChR (Stim 4-Male-Lunge) CAP > GFP vs CAP > CsChR (Stim 5-Male-Lunge) CAP > GFP vs CAP > CsChR	15 pairs vs 15 pairs	Mann-Whitney U-test	2	112		-Inf							
		15 pairs vs 15 pairs		2	112.5		-Inf							
		15 pairs vs 15 pairs		2	112.5		-Inf							
		15 pairs vs 15 pairs		2	112.5		-Inf							
		15 pairs vs 15 pairs		2	112		-Inf							
		15 pairs vs 15 pairs		2	112		-Inf							
4Bi	Male mean ΔF/F vs Female mean ΔF/F Male Pre-stim vs Stim mean ΔF/F Female Pre-stim vs Stim mean ΔF/F	15 files vs 15 files	Mann-Whitney U-test	0.033998	68		1.825				24.109			
		15 files		6.10E-05		0								
4Bii	(Chrimson) Male intensity vs Female intensity (GCaMP) Male intensity vs Female intensity	15 files vs 15 files	Mann-Whitney U-test	0.58974	99		0.5392				24.109			
		15 files vs 15 files		0.34009	89	0.954			24.109					
<b>Figure 5</b>														
Comparisons (Group 1 (G1) vs Group 2 (G2))														
5Ai	(Male) CAP > GFP vs CAP > CsChR During Stimulation (Male) CAP > CsChR Before vs During Stimulation	16 pairs vs 16 pairs	Mann-Whitney U-test Wilcoxon signed-rank test	0.089633	97.5		1.6973							
		16 pairs		0.25		0								
5Aii	(Male) MAP > GFP vs MAP > CsChR During Stimulation (Male) MAP > CsChR Before vs During Stimulation	16 pairs vs 16 pairs	Mann-Whitney U-test Wilcoxon signed-rank test	1.48E-06	17		4.814							
		16 pairs		1.22E-04		0								
5B	(Male-Approach > attack) MAP > GFP vs MAP > Kir2.1 (Male-Approach) MAP > GFP vs MAP > Kir2.1 (Male-Lunge) MAP > GFP vs MAP > Kir2.1	24 pairs vs 24 pairs	Mann-Whitney U-test	1.49E-03	141		3.1773							
		24 pairs vs 24 pairs		0.67226	267	0.4231								
5C	(Approach > attack) CAP+MAP > Chr & Empty driver > Kir2.1 vs CAP+MAP > Chr & MAP > Kir2.1 (Approach) CAP+MAP > Chr & Empty driver > Kir2.1 vs CAP+MAP > Chr & MAP > Kir2.1 (Lunge) CAP+MAP > Chr & Empty driver > Kir2.1 vs CAP+MAP > Chr & MAP > Kir2.1	16 pairs vs 16 pairs	Mann-Whitney U-test	0.005147	168.5		2.5658							
		16 pairs vs 16 pairs		1.12E-06	0	4.87								
5D	(Female) CAP > GFP vs CAP > CsChR During Stimulation (Female) CAP > CsChR Before vs During Stimulation	16 pairs vs 16 pairs	Mann-Whitney U-test Wilcoxon signed-rank test	0.057944	77.5		1.8961							
		16 pairs vs 16 pairs		3.60E-06	6	4.633								
16 pairs vs 16 pairs	1.12E-06	0	4.87											
16 pairs	1.22E-04		0											
<b>Figure 6</b>														
Comparisons (Group 1 (G1) vs Group 2 (G2))														
6Aii	MAP mean ΔF/F Pre-stim vs Stim MAP mean ΔF/F Stim vs fpC1 mean ΔF/F Stim	10 files	Wilcoxon signed-rank test Mann-Whitney U-test	2.00E-03			0							
		10 files vs 8 files		0.006728	9	2.71	0		11.255					
6Ci	fpC1 mean ΔF/F Pre-stim vs Stim fpC1 > Chrimson (26E01Gal4 + dsxFlp + FlpOFF cassette) Pre-stim vs Stim fpC1 > STOP (BDP64U + dsxFlp + FlpOFF cassette) stim vs fpC1 > Chrimson (26E01Gal4 + dsxFlp + FlpOFF cassette) Stim	8 files	Wilcoxon signed-rank test	1.80E-03			0							
		16 pairs vs 16 pairs		0.20325	85	1.2723								
6Cii	fpC1 > Chrimson (26E01Gal4 + dsxFlp + FlpOFF cassette) Pre-stim vs Stim fpC1 > STOP (BDP64U + dsxFlp + FlpOFF cassette) stim vs fpC1 > Chrimson (26E01Gal4 + dsxFlp + FlpOFF cassette) Stim	16 pairs	Wilcoxon signed-rank test	0.0078			2.5							
		8 pairs vs 16 pairs		0.028589	31.5	2.1891								
6D	(Approach > attack) fpC1 > GFP vs fpC1 > Kir2.1 (Approach) fpC1 > GFP vs fpC1 > Kir2.1 (Headbutt) fpC1 > GFP vs fpC1 > Kir2.1	8 pairs vs 12 pairs	Mann-Whitney U-test	4.40E-04	4		3.515							
		8 pairs vs 12 pairs		0.14398	33	1.4383								
6E	(Approach > attack) Ctrl vs fpC1 > Kir2.1 (Approach) Ctrl vs fpC1 > Kir2.1 (Headbutt) Ctrl vs fpC1 > Kir2.1	16 pairs vs 16 pairs	Mann-Whitney U-test	2.52E-04	2		3.6598							
		16 pairs vs 16 pairs		2.45E-04	24	3.6669								
16 pairs vs 16 pairs	0.009466	49.5	2.5947											
16 pairs vs 16 pairs	0.001528	35.5	3.1892											
<b>Figure 7</b>														
Comparisons (Group 1 (G1) vs Group 2 (G2))														
7Ai	(MAP) GH mean ΔF/F Pre-stim vs Stim (MAP) SH mean ΔF/F Pre-stim vs Stim (MAP) GH mean ΔF/F stim vs SH mean ΔF/F stim (fpC1) GH mean ΔF/F Pre-stim vs Stim	14 files	Wilcoxon signed-rank test Wilcoxon signed-rank test Mann-Whitney U-test Wilcoxon signed-rank test	0.583			43							
		14 files		1.22E-04		0								
		14 files vs 14 files		0.005439	37	2.7798								
		16 files		4.38E-04		-3.516								

