SUPPLEMENTARY MATERIAL

Extended Methods

Subjects

Cage changes occurred one day prior to the start of DID and were not performed again during the 8-day DID experiment. Mice had *ad libitum* access to LabDiet 5001 (a standard rodent chow), including during DID testing. Mice had *ad libitum* access to water through standard home cage water bottles, except during the DID sessions where their standard home cage water bottles were replaced with volumetric drinking monitor sippers containing 20% EtOH (or water if they were in the water drinking group). Home cage water bottles did not utilize the volumetric drinking sippers but did contain sippers with identical-sized drinking orifices.

iDISCO+ Tissue Clearing with c-fos Immunostaining

All washes and incubations were conducted using a shaker. All steps were conducted at room temperature unless otherwise specified. On day 1, brains were pre-treated with increasing concentrations of methanol (MeOH) diluted in MilliQ water. Brains were placed in the MeOH solutions for one hour each: 20%, 40%, 60%, 80%, and then 100% (2 times). Brains were then placed in 33% MeOH/66% dichloromethane (DCM) in a fume hood overnight. On day 2, brains were washed in 100% MeOH and then chilled for 10 minutes at 4˚C. Brains were then bleached with chilled 5% hydrogen peroxide in MeOH overnight at 4˚C. On day 3, brains were rehydrated with decreasing concentrations of MeOH. Brains were placed in the MeOH solutions for one hour each: 80%, 60%, 40%, 20%, then 1x PBS containing 0.02% sodium azide. Brains were then washed twice in PBS/0.2% TritonX-100/0.2% sodium azide for one hour each wash. Brains were then incubated in PBS/0.2% TritonX-100/20% dimethyl sulfoxide (DMSO)/0.3 M glycine/0.02% sodium azide (permeabilization solution) overnight at 37 ˚C. On day 4, brains remained in the permeabilization solution. On days 5 and 6, brains were incubated in PBS/0.2%

TritonX-100/10% DMSO/6% donkey serum/0.02% sodium azide (blocking solution) at 37˚C. On day 7, brains were incubated in c-fos rabbit primary antibody (1:3000, Synaptic Systems, #226 008) in PBS with 0.2% Tween and 10 µg/mL heparin (PTwH)/5% DMSO/3% donkey serum at 37˚C. This primary antibody concentration was selected following a test of 1:1000, 1:3000, and 1:10000 in 6 mice (1 of each sex at each concentration), perfused after 70 minutes of DID on day 8 in experiment 1. Brains remained in the primary antibody for one full week (day 7-the morning of day 14). On the morning of day 14, brains were washed with PtWH 5 times, one hour per wash. Brains remained in the final PtWH wash overnight. On day 15, the secondary antibody was applied. Brains were also moved to opaque black tubes to prevent photobleaching. Donkey anti-rabbit Alexa647 (1:500, Thermo-Fisher, # A-31573) was placed in 3% NDS in PtwH at 37˚C and brains remained in this secondary antibody solution until the morning of day 22. On the morning of day 22, brains were washed with PtWH 5 times, one hour per wash. Brains remained in the final PtWH wash overnight. On day 23, brains were dehydrated with increasing concentrations of MeOH. Brains were placed in the MeOH solutions for one hour each: 20%, 40%, 60%, 80%, and then 100%, then were placed in a fresh solution of 100% MeOH overnight. On day 24, brains were incubated in 66% DCM/33% MeOH for 3 hours, then washed twice (15 minutes per wash) in 100% DCM to remove any remaining MeOH. Brains were then stored in dibenzyl ether in new black opaque tubes until they were imaged. For a list of reagents used and their supplier, see *Supplementary Table 1.*

Statistical Assessment of Frontloading

In brief, a change point algorithm was applied to determine 3 change points in the DID session where the rate of intake differed the most in the session. Then three criteria were assessed, where the change point with the best fit statistically was the reference for all criteria. 1) The change point with the best fit statistically was the earliest change point and/or was within the first half of the session. (2) The pre-change point slope was significantly greater than the

post change-point slope, as determined through a *t*-test comparing beta weights of pre versus post change point regressions. (3) The pre-change point slope exceeded the rate of alcohol metabolism. If all three criteria were met, subjects would be categorized as frontloaders. If any criteria were not met, subjects were categorized as non-frontloaders.

VDM sipper access was staggered by 5 minutes on all days of DID testing to account for the need to have time to perfuse all mice 80 minutes after their DID sipper access day 8. An additional criterion was applied to the change point frontloading classification analysis where mice had to consume greater than 16.667% of their total intake within the first 20 minutes to be considered frontloaders on day 8 (in addition to meeting all 3 change point criteria described above). It should be noted that 20 minutes represents 16.667% of a two-hour DID session, therefore it was expected that mice would have greater than 16.667% of their total intake within 20 minutes if the mice were displaying frontloading behavior. The 20-minute timepoint is of interest as this is the average change point for frontloaders (Figures 10I, 11I) and was used to determine the 80-minute perfusion timepoint. This ensured that mice in the frontloading group were displaying frontloading behavior within the 20-minute time point of interest to be captured by c-fos activity. Including this intake percentage criterion only reclassified two male mice from the frontloader group to the non-frontloader group on day 8 (as compared to if the change point criteria were used without this additional criterion).. Day 8 classification (i.e. frontloader, non-frontloader, or water control group) was used for subsequent brain network analyses as this is the day the brains were extracted and the behavior was displayed and captured in the c-fos expression.

Light Sheet Imaging

Brains were imaged using a light-sheet microscope (UltraMicroscope II, Miltenyi Biotec) equipped with a sCMOS camera (Andor Neo) and zoom body configuration. Imspector Pro software 7.1.4 (Lavision Biotec, Bielefeld, Germany) controlled the microscope. The microscope

had a NKT Photonics SuperK EXTREME EXW-12 white light laser with three fixed light sheet generating lenses on each side. Filters at 488 and 640 nm were used to capture autofluorescence and c-fos image stacks, respectively. Right hemisphere scans were completed at 0.8x magnification (1.6x effective magnification) with a light sheet numerical aperture of 0.026. Brains were first scanned for autofluorescence at 488 nm with an exposure time of 50 ms, step-size of 10 um, laser transmission control of 50, and sheet width of 100%. Brains were then scanned for c-fos at 640 nm with an exposure time of 50 ms, step-size of 3 um, laser transmission control of 100, and sheet width of 100. The dynamic focus feature was used when scanning at 640 nm. The imaging resolution was (x = 3.780 µm, y = 3.780 µm, z = 3 µm) for the c-fos 640 nm image stacks and (x = 3.780 µm, y = 3.780 µm, z = 10 µm) for the 488 nm autofluorescence image stacks.

ClearMap2.1 to Identify fos+ Cells

Image stacks were individually cropped to be processed from the bottom of the olfactory bulbs to the beginning of the cerebellum. The individual cropping was necessary as not all brains were the exact same size (e.g., female brains tended to be slightly smaller than male brains). The autofluorescence images captured using the 488 nm filter were registered to a reference image stack which has known corresponding brain region divisions from the Allen Brain Adult Mouse 25µm Atlas (4). This registered Allen Brain Atlas map was then used to delineate brain regions for the c-fos image stack captured with the 640 nm filter. Each brain was individually visually inspected for appropriate alignment to the Allen Brain Atlas reference using the hippocampus as a primary landmark.

Previous validation of the ClearMap pipeline indicates 99% accuracy in the automatic detection of fos+ cells as compared to a manual fos+ cell counting approach (4). The cell detection parameters (20 pixel diameter, 3 pixel maxima) used were identical to the well-validated Renier et al. (2016) publication and others (11). However, a more conservative cell

filter was applied (min 50 voxels, max 400 voxels) due to overcounting with the default cell filter (min 0 voxels, max 700) in our dataset. These same cell detection and filter parameters were applied to every brain to ensure that differences in fos+ cell counts between groups were due to actual differences between groups and not differences in fos+ cell detection method. Using this ClearMap2.1 pipeline, 441 brain regions with fos+ cells were identified. For easier interpretation of analyses, these brain regions were collapsed into larger divisions. For example, initially, distinct cell counts were identified for the lateral vestibular nucleus, medial vestibular nucleus, spinal vestibular nucleus, and superior vestibular nucleus. Fos+ cell counts from all four of these brain regions were then added together into one brain region named “vestibular nuclei.” Brain regions were only collapsed once, e.g., vestibular nuclei were not then also collapsed with the rest of the brain regions which comprise the “medulla, motor related” within their Allen Brain Atlas division. After collapsing brain regions once, 200 brain regions were identified. The number of brain regions identified using this approach can vary based upon how many divisions are collapsed. Previous studies using similar techniques have reported fos+ cells from 178 (11), 123 (8), 306 (6), and 110 (9) regions. As some brain regions are larger than others, all fos+ counts were log10 transformed to facilitate comparison of activation in the whole brain. This approach of using log transformation to normalize whole brain fos+ cell counts is common practice in the field (8, 10, 11, 53, 54).

Correlation Matrices

Functional connectivity matrices were calculated separately for each group and sex. Note that only two female mice were in the non-frontloading group on day 8. Therefore, it was not possible to calculate correlation matrices and brain network diagrams for female non-frontloaders. Log_{10} Fos+ values were used to calculate Pearson correlations from every brain region to each of the other regions across mice within a group. These matrices were then organized anatomically using the Allen Brain Atlas with the following divisions annotated: cortical

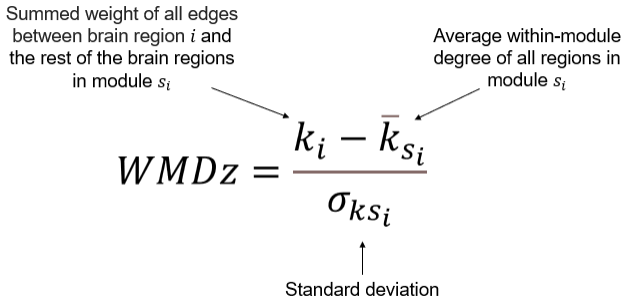
plate, cortical subplate, striatum, pallidum, thalamus, hypothalamus, midbrain, and hindbrain. Note that this organization did not change the correlation values and was used for visualization only. This method of creating functional connectivity matrices using Pearson correlations and then organizing them anatomically is common practice in this field (6-11, 16, 17, 59).

To assess if there were differences between sex and group, R values in each matrix were thresholded at $p < 0.05$ to only include significant correlations for group comparisons. Anatomical divisions (cortical plate, cortical subplate, striatum, pallidum, thalamus, hypothalamus, midbrain, and hindbrain) were analyzed separately using 2 (sex) x 2 (frontloaders vs. water) 2-way ANOVAs. Sidak's multiple comparisons post-hoc tests were then used to further assess significant effects of sex and group. A similar analysis was completed in only males to include their non-frontloading group: a one-way ANOVA of groups (frontloaders vs. non-frontloaders vs. water).

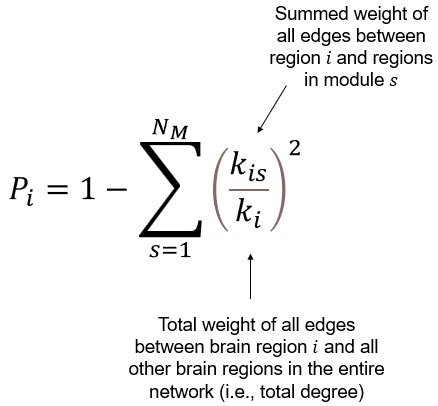
Creation of Networks and Identification of Hub Brain Regions

Key brain regions were identified using a graph theory approach for each group and sex (i.e., 5 networks total were assessed: male frontloaders, male non-frontloaders, male water, female frontloaders, female water). To construct each network, the Pearson correlations between pairs of brain regions, *Figure 2*, were thresholded to only include values above R = 0.7. This allowed the networks and connectivity metrics to be calculated using only strong positive edge weights. The modular structure identified using hierarchical clustering was used to divide each network into modules. The connectivity metrics within module degree z-score (WMDz) and participation coefficient were calculated as described by Guimerà and Nunes Amaral (2005), but modified for networks with weighted edges. WMDz describes how connected a brain region is to the other brain regions within its own module, *Equation 1*. Participation coefficient describes how distributed the connections of a brain region are throughout the network. A participation coefficient of 0 would indicate that a brain region’s connections are completely within its own

module. A participation coefficient of 1 would indicate that a brain region's connections are equally distributed among all the modules, *Equation 2*. These connectivity metrics were designed to be applied specifically to modulated networks and can be used to identify each brain region's contribution to the network, ultimately allowing for the identification of important regions within each module and the network as a whole (55). WMDz and participation coefficient were calculated using customized code from the bctpy Python package (https://github.com/aestrivex/bctpy), which is a Python version of the widely implemented Matlab brain-connectivity toolbox (56). We thank Dr. Adam Kimbrough's lab for sharing their customized Python code to calculate these connectivity metrics, see Kimbrough et al. (2020 and 2021) for previous implementation of these analyses. Networks were visualized using Gephi 0.10 and Inkscape 1.1.



Equation 1. Within Module Degree z-Score.

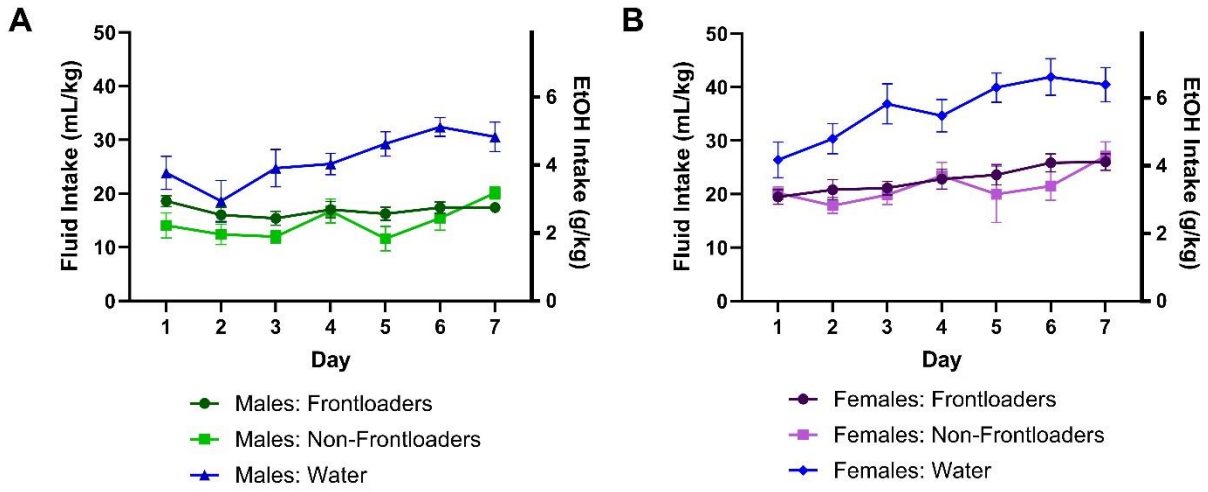


Equation 2. Participation Coefficient.

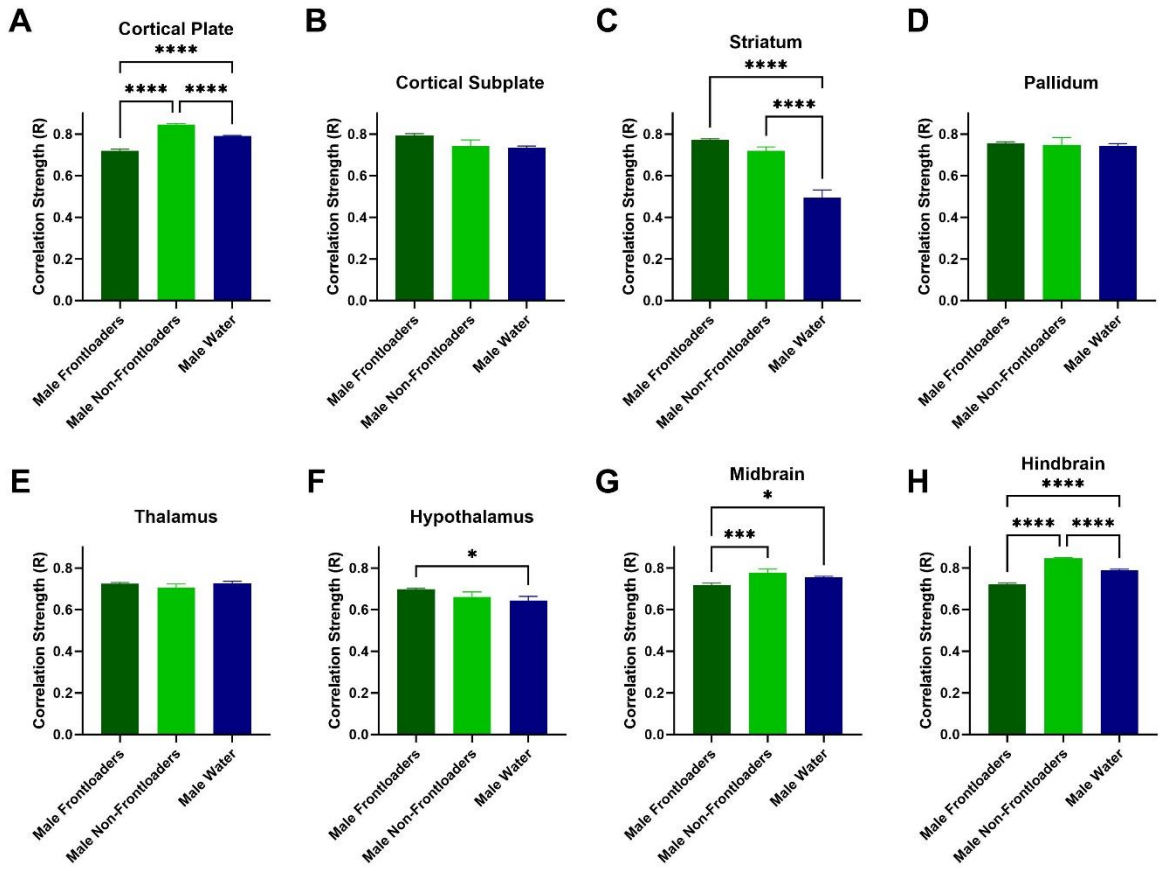
Once intramodule connectivity (WMDz) and intermodule connectivity (participation coefficient) were identified for each brain region, it was possible to identify the role of each brain region in each network, *Supplementary Figure 3*. The relationship between participation coefficient and WMDz was used to classify brain regions as follows: ultra-peripheral nodes (participation coefficient ≤ 0.05, WMDz < 0.7), peripheral nodes (0.05 < participation coefficient ≤ 0.62, WMDz < 0.7), non-hub connector nodes (0.62 < participation coefficient, WMDz < 0.7), provincial hubs (participation coefficient ≤ 0.3, WMDz > 0.7), and connector hubs (0.3 < participation coefficient, WMDz > 0.7). The participation coefficient divisions are as described in Guimerà and Nunes Amaral (2005), noting that kinless hubs (participation coefficients > 0.8) were not found in our dataset and are not mathematically possible in networks with 3 modules or less (60). The WMDz threshold for hubs versus non-hubs (WMDz > 0.7 classifies a brain region as a hub) is as described in Kimbrough et al. (2020), where there is a need to adjust the threshold for WMDz for c-fos data as compared to functional magnetic resonance imaging data or metabolic network data.

To identify brain regions that may uniquely drive frontloading behavior, lists of connector hubs (high WMDz and high participation coefficient), provincial hubs (high WMDz) and non-hub connector nodes (high participation coefficient) were compared within sex between groups.

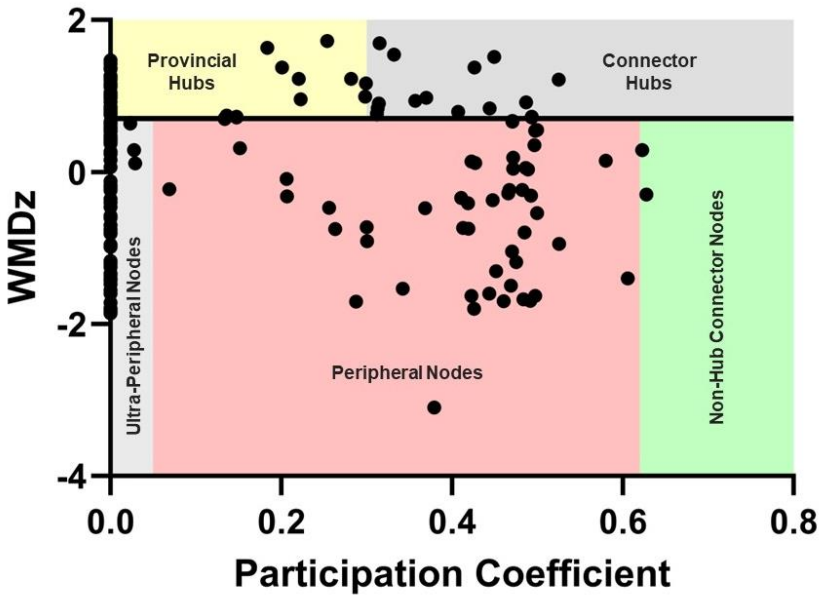
Brain regions in these categories with overlap between frontloaders and non-frontloaders or frontloaders and water drinkers were considered to not be uniquely important in frontloading behavior. A final list of connector hubs, provincial hubs, and non-hub connector nodes with no overlap between frontloaders and their within-sex control groups was generated. These brain regions may be uniquely important in frontloading behavior.



Supplementary Figure 1. Total DID session intakes of males (A) and females (B).



Supplementary Figure 2. Correlation strength (R value) is compared across groups within anatomical subdivisions. Note that only significant R values ($p < 0.05$) were included in these analyses. Male frontloaders had lower R values in the cortical plate (A), midbrain (G), and hindbrain (H) as compared to both control groups. Male frontloaders displayed higher R values in the striatum (C) and hypothalamus (F) as compared to water drinkers. These results suggest that frontloading alters the strength of functional connectivity differently across some anatomical subdivisions, and not at all in others.



Supplementary Figure 3. An example of how the relationship between participation coefficient and within-module degree z-score (WMDz) was used to classify each brain region in a network. Here, male frontloaders are shown. The classifications are as follows: ultra-peripheral nodes (participation coefficient ≤ 0.05, WMDz < 0.7), peripheral nodes (0.05 < participation coefficient ≤ 0.62, WMDz < 0.7), non-hub connector nodes (0.62 < participation coefficient, WMDz < 0.7), provincial hubs (participation coefficient ≤ 0.3, WMDz > 0.7), and connector hubs (0.3 < participation coefficient, WMDz > 0.7).

Supplementary Table 1. List of reagents and suppliers for iDISCO tissue clearing and immunohistochemistry.

Product	Supplier and Product ID
Sodium azide	Sigma-Aldrich, S2002-100G
TritonX-100	Fisher, BP151-100
Heparin	Sigma-Aldrich, H3393-50KU
Hydrogen Peroxide	Sigma-Aldrich, 216763-100ML
Tween-20	Fisher, BP337-100
Glycine	Sigma-Aldrich, G7126-500G
DMSO	Sigma-Aldrich, 472301-1L
Methanol	Fisher, BP11054
Dibenzyl Ether	Sigma-Aldrich, 108014-1KG
Opaque Black 5 mL Tubes	Dot Scientific, Inc, 229439
C-fos Primary Antibody (Rabbit)	Synaptic Systems, 226 008
Donkey anti-Rabbit IgG (H+L) Highly Cross-Adsorbed Secondary Antibody, Alexa Fluor™ 647	Thermo-Fisher, # A-31573

Supplementary Table 2. Intake data considering sex as a factor for experiment 2. Note that the water group is not included in these analyses.

Total 2-Hour DID Session Intake		
Source of Variation	*F (DFn, DFd)*	*P value*
Day	F (6, 274) = 4.920	P < 0.0001****
Sex	F (1, 274) = 76.47	P < 0.0001****
Group	F (1, 274) = 6.211	P < 0.05*
Day x Sex	F (6, 274) = 0.7349	P > 0.05
Day x Group	F (6, 274) = 1.221	P > 0.05
Sex x Group	F (1, 274) = 0.3311	P > 0.05
Day x Sex x Group	F (6, 274) = 0.4448	P > 0.05
Intake in the First 20 Minutes of DID		
Source of Variation	*F (DFn, DFd)*	*P value*
Day	F (6, 274) = 3.055	P < 0.01**
Sex	F (1, 274) = 8.399	P < 0.01**
Group	F (1, 274) = 98.43	P < 0.0001****
Day x Sex	F (6, 274) = 0.2102	P > 0.05
Day x Group	F (6, 274) = 1.463	P > 0.05
Sex x Group	F (1, 274) = 2.870	P > 0.05
Day x Sex x Group	F (6, 274) = 0.3567	P > 0.05
Change Point		
Source of Variation	*F (DFn, DFd)*	*P value*
Day	F (6, 274) = 0.7275	P > 0.05
Sex	F (1, 274) = 0.2143	P > 0.05
Group	F (1, 274) = 442.2	P < 0.0001****
Day x Sex	F (6, 274) = 2.487	P < 0.05*
Day x Group	F (6, 274) = 0.9241	P > 0.05
Sex x Group	F (1, 274) = 4.174	P < 0.05*
Day x Sex x Group	F (6, 274) = 2.099	P > 0.05

Supplementary Table 3. List of full brain region names and abbreviations.

Full Brain Region Name	Abbr.	Full Brain Region Name	Abbr.
Frontal pole, cerebral cortex	FRP	Accessory supraoptic group	ASO
Somatomotor areas	MO	Paraventricular hypothalamic nucleus	PVH
Primary somatosensory area, nose	SSp-n	Anterodorsal preoptic nucleus	ADP
Primary somatosensory area, barrel field	SSp-bfd	Anteroventral preoptic nucleus	AVP
Primary somatosensory area, lower limb	SSp-ll	Anteroventral periventricular nucleus	AVPV
Primary somatosensory area, mouth	SSp-m	Dorsomedial nucleus of the hypothalamus	DMH
Primary somatosensory area, upper limb	SSp-ul	Median preoptic nucleus	MEPO
Primary somatosensory area, trunk	SSp-tr	Medial preoptic area	MPO
Supplemental somatosensory area	SSs	Vascular organ of the lamina terminalis	OV
Gustatory areas	GU	Posterodorsal preoptic nucleus	PD
Visceral area	VISC	Parastrial nucleus	PS
Dorsal auditory area	AUDd	Periventricular hypothalamic nucleus, posterior part	PVp
Primary auditory area	AUDp	Periventricular hypothalamic nucleus, preoptic part	PVpo
Posterior auditory area	AUDpo	Subparaventricular zone	SBPV
Ventral auditory area	AUDv	Suprachiasmatic nucleus	SCH
Anterolateral visual area	VISal	Subfornical organ	SFO
Anteromedial visual area	VISam	Ventrolateral preoptic nucleus	VLPO
Lateral visual area	VISl	Anterior hypothalamic nucleus	AHN
Primary visual area	VISp	Mammillary body	MBO
Posterolateral visual area	VISpl	Medial preoptic nucleus	MPN
posteromedial visual area	VISpm	Paraventricular hypothalamic nucleus, descending division	PVHd
Anterior cingulate area, dorsal part	ACAd	Ventromedial hypothalamic nucleus	VMH
Anterior cingulate area, ventral part	ACAv	Posterior hypothalamic nucleus	PH
Prelimbic area	PL	Lateral hypothalamic area	LHA
Infralimbic area	ILA	Lateral preoptic area	LPO
Orbital area, lateral part	ORBl	Preparasubthalamic nucleus	PST
Orbital area, medial part	ORBm	Parasubthalamic nucleus	PSTN
Orbital area, ventrolateral part	ORBvl	Retrochiasmatic area	RCH
Agranular insular area, dorsal part	AId	Subthalamic nucleus	STN
Agranular insular area, posterior part	AIp	Tuberal nucleus	TU

Supplementary Table 3 continued

Agranular insular area, ventral part	Alv	Zona incerta	ZI
Retrosplenial area	RSP	Superior colliculus, sensory related	SCs
Temporal association areas	Tea	Inferior colliculus	IC
Perirhinal area	PERI	Nucleus of the brachium of the inferior colliculus	NB
Ectorhinal area	ECT	Nucleus sagulum	SAG
Main olfactory bulb	MOB	Parabigeminal nucleus	PBG
Accessory olfactory bulb	AOB	Midbrain trigeminal nucleus	MEV
Anterior olfactory nucleus	AON	Substantia nigra, reticular part	SNr
Taenia tecta	TT	Ventral tegmental area	VTA
Dorsal peduncular area	DP	Midbrain reticular nucleus, retrorubral area	RR
Piriform area	PIR	Midbrain reticular nucleus	MRN
Cortical amygdalar area	COA	Superior colliculus, motor related	SCm
Piriform-amygdalar area	PAA	Periaqueductal gray	PAG
Postpiriform transition area	TR	Pretectal region	PRT
Field CA1	CA1	Cuneiform nucleus	CUN
Field CA2	CA2	Red nucleus	RN
Field CA3	CA3	Oculomotor nucleus	III
Dentate gyrus	DG	Edinger-Westphal nucleus	EW
Entorhinal area	ENT	Trochlear nucleus	IV
Parasubiculum	PAR	Ventral tegmental nucleus	VTN
Postsubiculum	POST	Anterior tegmental nucleus	AT
Presubiculum	PRE	Lateral terminal nucleus of the accessory optic tract	LT
Subiculum	SUB	Substantia nigra, compact part	SNc
Claustrum	CLA	Pedunculopontine nucleus	PPN
Endopiriform nucleus	EP	Midbrain raphe nuclei	Ramb
Basolateral amygdalar nucleus	BLA	Nucleus of the lateral lemniscus	NLL
Posterior amygdalar nucleus	PA	Principal sensory nucleus of the trigeminal	PSV
Caudoputamen	CP	Parabrachial nucleus	PB
Nucleus accumbens	ACB	Superior olivary complex	SOC
Fundus of striatum	FS	Barringtons nucleus	B
Olfactory tubercle	OT	Dorsal tegmental nucleus	DTN
Lateral septal nucleus	LS	Pontine central gray	PCG
Septofimbrial nucleus	SF	Pontine gray	PG
Septohippocampal nucleus	SH	Pontine reticular nucleus, caudal part	PRNc
Anterior amygdalar area	AAA	Supragenual nucleus	SG
Bed nucleus of the accessory olfactory tract	BA	Supratrigeminal nucleus	SUT
Central amygdalar nucleus	CEA	Tegmental reticular nucleus	TRN
Intercalated amygdalar nucleus	IA	Motor nucleus of trigeminal	V

Supplementary Table 3 continued

Medial amygdalar nucleus	MEA	Superior central nucleus raphe	CS
Pallidum, dorsal region	PALd	Locus ceruleus	LC
Pallidum, ventral region	PALv	Laterodorsal tegmental nucleus	LDT
Medial septal complex	MSC	Nucleus incertus	NI
Pallidum, caudal region	PALc	Pontine reticular nucleus	PRNr
Ventral group of the dorsal thalamus	VENT	Nucleus raphe pontis	RPO
Ventral posterior complex of the thalamus	VP	Subceruleus nucleus	SLC
Subparafascicular nucleus	SPF	Sublaterodorsal nucleus	SLD
Subparafascicular area	SPA	Cochlear nuclei	CN
Peripeduncular nucleus	PP	Nucleus of the trapezoid body	NTB
Geniculate group, dorsal thalamus	GENd	Spinal nucleus of the trigeminal, oral part	SPVO
Lateral posterior nucleus of the thalamus	LP	Abducens nucleus	VI
Posterior complex of the thalamus	PO	Facial motor nucleus	VII
Posterior limiting nucleus of the thalamus	POL	Accessory facial motor nucleus	ACVII
Suprageniculate nucleus	SGN	Gigantocellular reticular nucleus	GRN
Anteroventral nucleus of thalamus	AV	Intermediate reticular nucleus	IRN
Anteromedial nucleus	AM	Magnocellular reticular nucleus	MARN
Anterodorsal nucleus	AD	Parvicellular reticular nucleus	PARN
Interanteromedial nucleus of the thalamus	IAM	Paragigantocellular reticular nucleus	PGRN
Lateral dorsal nucleus of thalamus	LD	Nucleus prepositus	PRP
Intermediodorsal nucleus of the thalamus	IMD	Vestibular nuclei	VNC
Mediodorsal nucleus of thalamus	MD	Nucleus x	x
Submedial nucleus of the thalamus	SMT	Central lobule	CENT
Perireunensis nucleus	PR	Culmen	CUL
Paraventricular nucleus of the thalamus	PVT	Simple lobule	SIM
Parataenial nucleus	PT	Ansiform lobule	AN
Nucleus of reuniens	RE	Paramedian lobule	PRM
Intralaminar nuclei of the dorsal thalamus	ILM	Paraflocculus	PFL
Ventral part of the lateral geniculate complex	LGv	Flocculus	FL
Subgeniculate nucleus	SubG	Fastigial nucleus	FN
Epithalamus	EPI	Interposed nucleus	IP
Supraoptic nucleus	SO	Dentate nucleus	DN

Supplementary Table 4. Each brain region's module and classified role in the male water functional connectivity network.

Region	Category	Module	PC	WMDz
SSp-tr	Connector Hub	1	0.58	1.22
SSp-ul	Connector Hub	1	0.58	0.94
Alv	Connector Hub	1	0.57	1.14
SSp-ll	Connector Hub	1	0.57	1.24
LS	Connector Hub	1	0.49	1.40
ILA	Connector Hub	1	0.47	0.71
ACB	Connector Hub	1	0.43	1.20
Ald	Peripheral Node	1	0.58	-0.63
VISam	Peripheral Node	1	0.54	0.32
MO	Peripheral Node	1	0.54	0.39
GU	Peripheral Node	1	0.50	-0.66
SH	Peripheral Node	1	0.50	-1.36
SMT	Peripheral Node	1	0.48	-1.03
CP	Peripheral Node	1	0.48	0.07
SSp-m	Peripheral Node	1	0.45	-0.65
DP	Peripheral Node	1	0.44	0.07
TT	Peripheral Node	1	0.44	-0.26
VISal	Peripheral Node	1	0.43	-1.73
ADP	Peripheral Node	1	0.23	-1.69
FRP	Non-Hub Connector Node	1	0.65	-0.69
LT	Connector Hub	2	0.62	0.71
PBG	Connector Hub	2	0.59	1.51
SNr	Connector Hub	2	0.59	2.17
MEA	Connector Hub	2	0.58	1.72
SSp-n	Connector Hub	2	0.55	1.36
SSs	Connector Hub	2	0.54	1.48
SO	Provincial Hub	2	0.20	1.11
SGN	Peripheral Node	2	0.59	-0.20
AD	Peripheral Node	2	0.56	-0.17
AAA	Peripheral Node	2	0.56	0.32
VISC	Peripheral Node	2	0.55	-0.04
LP	Peripheral Node	2	0.54	0.60
LPO	Peripheral Node	2	0.53	0.57
TU	Peripheral Node	2	0.50	0.70
PR	Peripheral Node	2	0.50	-1.36
Alp	Peripheral Node	2	0.49	-0.58
VP	Peripheral Node	2	0.48	0.26
RSP	Peripheral Node	2	0.45	-1.01
PALc	Peripheral Node	2	0.45	0.54

Supplementary Table 4 continued

PALv	Peripheral Node	2	0.44	0.26
AUDpo	Peripheral Node	2	0.44	-1.38
BA	Peripheral Node	2	0.43	0.32
SF	Peripheral Node	2	0.37	-0.57
MD	Peripheral Node	2	0.31	-0.26
PST	Peripheral Node	2	0.30	-0.18
PS	Ultra-Peripheral Node	2	0.00	-0.13
SFO	Ultra-Peripheral Node	2	0.00	-1.34
VISl	Ultra-Peripheral Node	2	0.00	-1.40
PA	Non-Hub Connector Node	2	0.72	-1.39
VISpm	Non-Hub Connector Node	2	0.71	-1.39
VENT	Non-Hub Connector Node	2	0.66	-0.44
SSp-bfd	Non-Hub Connector Node	2	0.65	-0.44
CLA	Non-Hub Connector Node	2	0.63	-1.36
ILM	Connector Hub	3	0.56	0.88
MBO	Connector Hub	3	0.53	1.22
PALd	Connector Hub	3	0.51	1.00
SPF	Connector Hub	3	0.51	1.87
MRN	Connector Hub	3	0.44	1.23
CA3	Connector Hub	3	0.43	0.88
LD	Connector Hub	3	0.40	0.73
AM	Connector Hub	3	0.39	1.60
VTA	Connector Hub	3	0.38	1.89
STN	Connector Hub	3	0.33	1.31
MPN	Provincial Hub	3	0.27	0.89
PAA	Provincial Hub	3	0.15	1.05
SPA	Peripheral Node	3	0.61	0.02
ZI	Peripheral Node	3	0.59	0.05
PH	Peripheral Node	3	0.58	0.59
PVT	Peripheral Node	3	0.57	-1.71
FS	Peripheral Node	3	0.57	-1.42
SOC	Peripheral Node	3	0.57	-0.66
PVp	Peripheral Node	3	0.57	0.43
NB	Peripheral Node	3	0.54	-0.21
PSTN	Peripheral Node	3	0.53	0.24
CEA	Peripheral Node	3	0.52	0.67
Tea	Peripheral Node	3	0.50	-1.43
SubG	Peripheral Node	3	0.50	-0.79
COA	Peripheral Node	3	0.49	-1.25
PD	Peripheral Node	3	0.48	-0.96
AUDd	Peripheral Node	3	0.47	-0.77
AUDp	Peripheral Node	3	0.45	-1.98

Supplementary Table 4 continued

VLPO	Peripheral Node	3	0.45	-0.39
EP	Peripheral Node	3	0.45	-0.21
PRT	Peripheral Node	3	0.45	-0.10
AUDv	Peripheral Node	3	0.44	-2.12
BLA	Peripheral Node	3	0.43	0.19
GENd	Peripheral Node	3	0.43	-0.22
NTB	Peripheral Node	3	0.42	-0.68
CA1	Peripheral Node	3	0.42	0.05
PO	Peripheral Node	3	0.41	0.25
DG	Peripheral Node	3	0.37	0.16
AV	Peripheral Node	3	0.36	0.12
DMH	Peripheral Node	3	0.35	-0.11
PP	Peripheral Node	3	0.23	-1.25
TR	Peripheral Node	3	0.21	-1.23
PVHd	Non-Hub Connector Node	3	0.67	0.31
CA2	Non-Hub Connector Node	3	0.65	-0.16
III	Connector Hub	4	0.41	0.77
DTN	Connector Hub	4	0.34	1.50
PCG	Connector Hub	4	0.31	0.78
TRN	Provincial Hub	4	0.22	1.46
NI	Provincial Hub	4	0.21	0.96
VISpl	Provincial Hub	4	0.17	0.83
FL	Provincial Hub	4	0.11	0.97
PRNc	Provincial Hub	4	0.11	1.17
PSV	Provincial Hub	4	0.07	0.76
LDT	Provincial Hub	4	0.06	1.06
V	Provincial Hub	4	0.05	1.76
MEV	Provincial Hub	4	0.04	2.67
VTN	Peripheral Node	4	0.52	-0.91
EPI	Peripheral Node	4	0.50	-2.88
IV	Peripheral Node	4	0.49	-0.22
SAG	Peripheral Node	4	0.47	-1.52
IRN	Peripheral Node	4	0.44	0.00
PARN	Peripheral Node	4	0.44	-0.93
RPO	Peripheral Node	4	0.43	-0.81
CS	Peripheral Node	4	0.39	0.60
PGRN	Peripheral Node	4	0.39	-1.09
VNC	Peripheral Node	4	0.38	0.36
AN	Peripheral Node	4	0.37	0.28
LC	Peripheral Node	4	0.36	0.46
PAG	Peripheral Node	4	0.36	-0.56
PRP	Peripheral Node	4	0.34	-1.09

Supplementary Table 4 continued

SPVO	Peripheral Node	4	0.34	-1.10
PFL	Peripheral Node	4	0.34	0.33
B	Peripheral Node	4	0.33	-0.51
CN	Peripheral Node	4	0.33	0.09
SG	Peripheral Node	4	0.30	0.46
GRN	Peripheral Node	4	0.29	0.19
PRE	Peripheral Node	4	0.29	-1.62
VI	Peripheral Node	4	0.27	0.37
AT	Peripheral Node	4	0.23	0.41
VISp	Peripheral Node	4	0.23	-1.04
POST	Peripheral Node	4	0.21	-0.85
SCm	Peripheral Node	4	0.18	-0.56
RR	Peripheral Node	4	0.15	-0.04
PG	Peripheral Node	4	0.13	0.45
SUT	Peripheral Node	4	0.07	0.41
SLD	Ultra-Peripheral Node	4	0.00	0.35
SLC	Ultra-Peripheral Node	4	0.00	-0.24
NLL	Ultra-Peripheral Node	4	0.00	-0.07
PRNr	Ultra-Peripheral Node	4	0.00	-0.09
PB	Ultra-Peripheral Node	4	0.00	-0.13
PPN	Ultra-Peripheral Node	4	0.00	-0.71
CUN	Ultra-Peripheral Node	4	0.00	-1.54
SCs	Ultra-Peripheral Node	4	0.00	-0.90
AOB	Connector Hub	5	0.50	0.86
PL	Connector Hub	5	0.49	1.93
MOB	Peripheral Node	5	0.56	-1.11
PIR	Peripheral Node	5	0.55	0.42
ACAd	Peripheral Node	5	0.51	-0.09
ORBm	Peripheral Node	5	0.50	-0.09
AON	Peripheral Node	5	0.49	0.54
ORBvl	Peripheral Node	5	0.49	0.08
ORBl	Peripheral Node	5	0.47	0.14
ACAv	Ultra-Peripheral Node	5	0.00	-0.58
ASO	Ultra-Peripheral Node	5	0.00	-2.11
SIM	Connector Hub	6	0.65	1.80
CENT	Connector Hub	6	0.45	1.23
ENT	Connector Hub	6	0.54	0.81
CUL	Connector Hub	6	0.62	1.74
PERI	Peripheral Node	6	0.36	-0.72
SUB	Peripheral Node	6	0.39	-0.18
MARN	Peripheral Node	6	0.40	-0.32
FN	Peripheral Node	6	0.46	0.34

Supplementary Table 4 continued

PRM	Peripheral Node	6	0.46	0.42
ACVII	Peripheral Node	6	0.49	0.33
IP	Peripheral Node	6	0.49	0.51
DN	Peripheral Node	6	0.49	0.52
VII	Peripheral Node	6	0.49	0.11
EW	Peripheral Node	6	0.50	-1.28
x	Peripheral Node	6	0.50	0.54
PAR	Peripheral Node	6	0.53	-0.28
IC	Peripheral Node	6	0.58	0.23
ECT	Peripheral Node	6	0.60	-0.75
LHA	Peripheral Node	6	0.66	-1.32
AHN	Ultra-Peripheral Node	6	0.00	-2.23
Ramb	Non-Hub Connector Node	6	0.64	0.65
LGv	Non-Hub Connector Node	6	0.67	-1.74
RE	Connector Hub	7	0.50	1.19
RCH	Connector Hub	7	0.50	0.88
PVpo	Connector Hub	7	0.49	0.75
PVH	Connector Hub	7	0.48	1.04
MEPO	Connector Hub	7	0.41	1.35
AVPV	Connector Hub	7	0.39	1.89
IAM	Connector Hub	7	0.35	1.02
POL	Peripheral Node	7	0.55	-0.81
SBPV	Peripheral Node	7	0.54	-0.11
OT	Peripheral Node	7	0.53	-0.47
RN	Peripheral Node	7	0.52	-1.85
SCH	Peripheral Node	7	0.50	-0.13
IMD	Peripheral Node	7	0.50	-0.67
OV	Peripheral Node	7	0.48	-0.21
IA	Peripheral Node	7	0.47	-1.03
MPO	Peripheral Node	7	0.35	-1.02
PT	Peripheral Node	7	0.17	-0.40
AVP	Ultra-Peripheral Node	7	0.00	-0.15
MSC	Ultra-Peripheral Node	7	0.00	-1.28

Supplementary Table 5. Each brain region's module and classified role in the male non-frontloader functional connectivity network.

Region	Category	Module	PC	WMDz
RE	Provincial Hub	1	0.00	0.89
PH	Provincial Hub	1	0.00	1.18
PVpo	Provincial Hub	1	0.00	1.25
PVH	Provincial Hub	1	0.00	1.30
AVPV	Provincial Hub	1	0.00	1.20
SCH	Provincial Hub	1	0.00	0.96
SPA	Provincial Hub	1	0.00	0.95
SBPV	Provincial Hub	1	0.00	0.75
IMD	Provincial Hub	1	0.00	1.45
MEPO	Provincial Hub	1	0.00	1.41
TT	Provincial Hub	1	0.00	0.77
RPO	Peripheral Node	1	0.50	-1.43
CS	Peripheral Node	1	0.28	-1.10
PAG	Peripheral Node	1	0.19	-0.40
EW	Ultra-Peripheral Node	1	0.00	-0.77
IV	Ultra-Peripheral Node	1	0.00	-1.13
MOB	Ultra-Peripheral Node	1	0.00	-0.08
III	Ultra-Peripheral Node	1	0.00	-1.34
PVT	Ultra-Peripheral Node	1	0.00	0.56
PVp	Ultra-Peripheral Node	1	0.00	0.34
AOB	Ultra-Peripheral Node	1	0.00	-0.28
AON	Ultra-Peripheral Node	1	0.00	-0.33
OV	Ultra-Peripheral Node	1	0.00	-0.82
ADP	Ultra-Peripheral Node	1	0.00	-0.90
AT	Ultra-Peripheral Node	1	0.00	-1.70
VTN	Ultra-Peripheral Node	1	0.00	-1.92
SFO	Ultra-Peripheral Node	1	0.00	0.12
SH	Ultra-Peripheral Node	1	0.00	-0.21
Ramb	Ultra-Peripheral Node	1	0.00	-0.39
FRP	Ultra-Peripheral Node	1	0.00	-0.34
CUN	Provincial Hub	2	0.06	0.88
CA3	Provincial Hub	2	0.00	1.50
CEA	Provincial Hub	2	0.00	1.30
ZI	Provincial Hub	2	0.00	1.30
PSTN	Provincial Hub	2	0.00	1.32
SSp-tr	Provincial Hub	2	0.00	1.29
CA2	Provincial Hub	2	0.00	1.26
SSp-bfd	Provincial Hub	2	0.00	1.51
PP	Provincial Hub	2	0.00	1.44

Supplementary Table 5 continued

SNc	Provincial Hub	2	0.00	1.37
LT	Provincial Hub	2	0.00	1.23
PALd	Provincial Hub	2	0.00	0.88
CA1	Provincial Hub	2	0.00	1.59
PIR	Provincial Hub	2	0.00	1.13
MEA	Provincial Hub	2	0.00	0.99
VISC	Provincial Hub	2	0.00	0.94
SUB	Provincial Hub	2	0.00	1.69
SPF	Provincial Hub	2	0.00	1.43
RR	Provincial Hub	2	0.00	1.36
TU	Provincial Hub	2	0.00	1.31
DG	Provincial Hub	2	0.00	1.28
LD	Provincial Hub	2	0.00	1.24
SSp-ul	Provincial Hub	2	0.00	1.20
AM	Provincial Hub	2	0.00	1.14
AAA	Provincial Hub	2	0.00	1.06
Alv	Provincial Hub	2	0.00	1.01
Alp	Provincial Hub	2	0.00	0.98
OT	Provincial Hub	2	0.00	0.92
LPO	Provincial Hub	2	0.00	0.89
MD	Provincial Hub	2	0.00	0.78
IA	Provincial Hub	2	0.00	0.75
ASO	Provincial Hub	2	0.00	0.71
MO	Provincial Hub	2	0.00	1.18
LP	Provincial Hub	2	0.00	1.14
PO	Provincial Hub	2	0.00	1.50
VENT	Provincial Hub	2	0.00	1.09
VTA	Provincial Hub	2	0.00	1.04
SSp-ll	Provincial Hub	2	0.00	0.99
ORBl	Provincial Hub	2	0.00	0.94
CLA	Provincial Hub	2	0.00	0.90
LHA	Provincial Hub	2	0.00	0.86
PALv	Provincial Hub	2	0.00	0.71
ECT	Provincial Hub	2	0.00	1.06
BLA	Provincial Hub	2	0.00	0.98
VP	Provincial Hub	2	0.00	0.93
STN	Provincial Hub	2	0.00	0.87
RSP	Provincial Hub	2	0.00	1.57
SNr	Provincial Hub	2	0.00	1.45
PERI	Provincial Hub	2	0.00	0.81
MRN	Provincial Hub	2	0.00	0.74
MBO	Peripheral Node	2	0.44	-1.98

Supplementary Table 5 continued

PRP	Peripheral Node	2	0.41	-1.44
PGRN	Peripheral Node	2	0.40	-1.33
IRN	Peripheral Node	2	0.36	-1.21
CN	Peripheral Node	2	0.35	-1.36
NTB	Peripheral Node	2	0.33	-1.78
PARN	Peripheral Node	2	0.31	-1.09
GRN	Peripheral Node	2	0.30	-0.94
SAG	Peripheral Node	2	0.28	-1.88
DTN	Peripheral Node	2	0.26	-1.65
DN	Peripheral Node	2	0.24	-1.13
MSC	Peripheral Node	2	0.21	-1.82
V	Peripheral Node	2	0.21	-0.76
MARN	Peripheral Node	2	0.17	-1.05
VI	Peripheral Node	2	0.16	-0.53
VNC	Peripheral Node	2	0.12	-0.01
AN	Peripheral Node	2	0.11	-0.49
VISpl	Peripheral Node	2	0.11	-1.02
VISl	Peripheral Node	2	0.11	-1.54
LC	Peripheral Node	2	0.09	-0.02
VISp	Peripheral Node	2	0.09	-0.20
SG	Peripheral Node	2	0.08	0.16
VII	Peripheral Node	2	0.08	-1.37
PFL	Peripheral Node	2	0.06	-0.22
SOC	Peripheral Node	2	0.06	-1.10
FL	Peripheral Node	2	0.06	0.08
ENT	Ultra-Peripheral Node	2	0.05	-0.69
BA	Ultra-Peripheral Node	2	0.00	0.63
PALc	Ultra-Peripheral Node	2	0.00	0.47
AUDp	Ultra-Peripheral Node	2	0.00	-0.51
EP	Ultra-Peripheral Node	2	0.00	0.47
POST	Ultra-Peripheral Node	2	0.00	0.35
SF	Ultra-Peripheral Node	2	0.00	0.21
DMH	Ultra-Peripheral Node	2	0.00	-0.97
CP	Ultra-Peripheral Node	2	0.00	0.54
VISpm	Ultra-Peripheral Node	2	0.00	-0.10
PB	Ultra-Peripheral Node	2	0.00	-0.31
AUDd	Ultra-Peripheral Node	2	0.00	-0.10
VISal	Ultra-Peripheral Node	2	0.00	-0.75
PPN	Ultra-Peripheral Node	2	0.00	-0.99
Tea	Ultra-Peripheral Node	2	0.00	0.55
ILM	Ultra-Peripheral Node	2	0.00	0.42
GENd	Ultra-Peripheral Node	2	0.00	0.02

Supplementary Table 5 continued

PL	Ultra-Peripheral Node	2	0.00	-0.08
CENT	Ultra-Peripheral Node	2	0.00	-0.09
PCG	Ultra-Peripheral Node	2	0.00	-0.43
PS	Ultra-Peripheral Node	2	0.00	-0.66
PR	Ultra-Peripheral Node	2	0.00	-0.71
LDT	Ultra-Peripheral Node	2	0.00	-1.04
EPI	Ultra-Peripheral Node	2	0.00	-1.16
SLD	Ultra-Peripheral Node	2	0.00	-1.35
ILA	Ultra-Peripheral Node	2	0.00	0.30
LS	Ultra-Peripheral Node	2	0.00	0.30
PST	Ultra-Peripheral Node	2	0.00	-0.19
AUDv	Ultra-Peripheral Node	2	0.00	-0.56
SSp-m	Ultra-Peripheral Node	2	0.00	-0.89
PT	Ultra-Peripheral Node	2	0.00	-1.23
FS	Ultra-Peripheral Node	2	0.00	0.69
ACB	Ultra-Peripheral Node	2	0.00	0.66
AV	Ultra-Peripheral Node	2	0.00	0.58
SGN	Ultra-Peripheral Node	2	0.00	0.10
SSp-n	Ultra-Peripheral Node	2	0.00	-0.14
ACAd	Ultra-Peripheral Node	2	0.00	-0.25
MPO	Ultra-Peripheral Node	2	0.00	-0.70
NLL	Ultra-Peripheral Node	2	0.00	-0.71
LGv	Ultra-Peripheral Node	2	0.00	-1.36
AId	Ultra-Peripheral Node	2	0.00	0.60
PD	Ultra-Peripheral Node	2	0.00	0.57
SSs	Ultra-Peripheral Node	2	0.00	0.43
DP	Ultra-Peripheral Node	2	0.00	0.24
SCm	Ultra-Peripheral Node	2	0.00	0.09
COA	Ultra-Peripheral Node	2	0.00	0.09
RCH	Ultra-Peripheral Node	2	0.00	-0.03
POL	Ultra-Peripheral Node	2	0.00	-0.18
B	Ultra-Peripheral Node	2	0.00	-0.42
IC	Ultra-Peripheral Node	2	0.00	-0.47
PBG	Ultra-Peripheral Node	2	0.00	-0.62
TR	Ultra-Peripheral Node	2	0.00	-0.96
PRT	Ultra-Peripheral Node	2	0.00	-1.02
ACAv	Ultra-Peripheral Node	2	0.00	-1.10
PVHd	Ultra-Peripheral Node	2	0.00	-1.31
SubG	Ultra-Peripheral Node	2	0.00	-1.63
IAM	Ultra-Peripheral Node	2	0.00	-1.69
PRNr	Ultra-Peripheral Node	2	0.00	-1.77
VMH	Ultra-Peripheral Node	2	0.00	-1.78

Supplementary Table 5 continued

AVP	Ultra-Peripheral Node	2	0.00	-1.91
ORBm	Ultra-Peripheral Node	2	0.00	-2.01
NB	Ultra-Peripheral Node	2	0.00	0.53
SCs	Ultra-Peripheral Node	2	0.00	0.01
SIM	Ultra-Peripheral Node	2	0.00	-0.73
SMT	Ultra-Peripheral Node	2	0.00	-1.18
SLC	Ultra-Peripheral Node	2	0.00	-1.39
PRE	Ultra-Peripheral Node	2	0.00	0.69
GU	Ultra-Peripheral Node	2	0.00	0.56
MEV	Ultra-Peripheral Node	2	0.00	0.07
RN	Ultra-Peripheral Node	2	0.00	-0.11
PAR	Ultra-Peripheral Node	2	0.00	-0.49
CUL	Ultra-Peripheral Node	2	0.00	-0.49
SO	Ultra-Peripheral Node	2	0.00	-0.59
AD	Ultra-Peripheral Node	2	0.00	-1.15
MPN	Ultra-Peripheral Node	2	0.00	-1.91
VLPO	Ultra-Peripheral Node	2	0.00	0.53
PA	Ultra-Peripheral Node	2	0.00	0.31
AUDpo	Ultra-Peripheral Node	2	0.00	-0.29
NI	Ultra-Peripheral Node	2	0.00	-0.76
PAA	Ultra-Peripheral Node	2	0.00	0.58
AHN	Ultra-Peripheral Node	2	0.00	0.13
ORBvl	Ultra-Peripheral Node	2	0.00	-0.59
VISam	Ultra-Peripheral Node	2	0.00	0.11
IP	Connector Hub	3	0.43	1.21
SPVO	Connector Hub	3	0.42	1.21
PRM	Connector Hub	3	0.40	1.10
PSV	Peripheral Node	3	0.52	-0.07
SUT	Peripheral Node	3	0.52	-0.03
x	Peripheral Node	3	0.49	-0.23
FN	Peripheral Node	3	0.47	-0.22
TRN	Peripheral Node	3	0.43	-1.42
PG	Peripheral Node	3	0.41	0.35
PRNc	Peripheral Node	3	0.34	-1.91

Supplementary Table 6. Each brain region's module and classified role in the male frontloader functional connectivity network.

Region	Category	Module	PC	WMDz
CP	Provincial Hub	1	0.00	1.42
Alv	Provincial Hub	1	0.00	1.23
CA3	Provincial Hub	1	0.00	1.23
STN	Provincial Hub	1	0.00	1.37
PAA	Provincial Hub	1	0.00	1.04
RSP	Provincial Hub	1	0.00	0.84
RN	Provincial Hub	1	0.00	0.78
BLA	Provincial Hub	1	0.00	0.78
AAA	Provincial Hub	1	0.00	0.77
LS	Provincial Hub	1	0.00	0.75
SSp-tr	Provincial Hub	1	0.00	1.21
EP	Provincial Hub	1	0.00	1.16
CA1	Provincial Hub	1	0.00	1.14
PALc	Provincial Hub	1	0.00	0.83
VENT	Provincial Hub	1	0.00	0.81
SSp-ul	Provincial Hub	1	0.00	1.47
MO	Provincial Hub	1	0.00	1.35
SSp-ll	Provincial Hub	1	0.00	1.26
ACB	Provincial Hub	1	0.00	1.12
SCm	Provincial Hub	1	0.00	1.02
PIR	Provincial Hub	1	0.00	0.99
LPO	Provincial Hub	1	0.00	0.98
SSp-bfd	Provincial Hub	1	0.00	0.97
VISC	Provincial Hub	1	0.00	0.92
LHA	Provincial Hub	1	0.00	0.86
MEA	Provincial Hub	1	0.00	0.76
SNr	Provincial Hub	1	0.00	0.75
SNc	Provincial Hub	1	0.00	1.33
AON	Provincial Hub	1	0.00	0.84
MRN	Provincial Hub	1	0.00	1.09
PALd	Provincial Hub	1	0.00	1.05
Alp	Provincial Hub	1	0.00	0.99
COA	Provincial Hub	1	0.00	0.92
PRE	Provincial Hub	1	0.00	0.85
CEA	Provincial Hub	1	0.00	0.84
PALv	Provincial Hub	1	0.00	1.23
Ald	Provincial Hub	1	0.00	1.01
CN	Peripheral Node	1	0.50	-1.63
PD	Peripheral Node	1	0.49	-1.69

Supplementary Table 6 continued

VTA	Peripheral Node	1	0.48	-1.67
TT	Peripheral Node	1	0.47	-1.49
RCH	Peripheral Node	1	0.46	-1.70
FN	Peripheral Node	1	0.44	-1.60
V	Peripheral Node	1	0.43	-1.80
AHN	Peripheral Node	1	0.42	-1.63
PSV	Peripheral Node	1	0.34	-1.53
PRNr	Peripheral Node	1	0.29	-1.70
MSC	Peripheral Node	1	0.07	-0.22
ENT	Ultra-Peripheral Node	1	0.03	0.12
SPF	Ultra-Peripheral Node	1	0.03	0.29
SUB	Ultra-Peripheral Node	1	0.02	0.64
DP	Ultra-Peripheral Node	1	0.00	0.55
POL	Ultra-Peripheral Node	1	0.00	0.57
AM	Ultra-Peripheral Node	1	0.00	0.41
PO	Ultra-Peripheral Node	1	0.00	0.38
DG	Ultra-Peripheral Node	1	0.00	-0.24
VP	Ultra-Peripheral Node	1	0.00	0.57
AUDpo	Ultra-Peripheral Node	1	0.00	-0.17
AUDd	Ultra-Peripheral Node	1	0.00	0.65
CA2	Ultra-Peripheral Node	1	0.00	0.54
BA	Ultra-Peripheral Node	1	0.00	0.54
ORBvl	Ultra-Peripheral Node	1	0.00	-0.02
SSp-m	Ultra-Peripheral Node	1	0.00	0.64
AD	Ultra-Peripheral Node	1	0.00	-1.17
CUN	Ultra-Peripheral Node	1	0.00	-1.35
PA	Ultra-Peripheral Node	1	0.00	0.45
VISpl	Ultra-Peripheral Node	1	0.00	-0.79
AOB	Ultra-Peripheral Node	1	0.00	-0.95
ACAd	Ultra-Peripheral Node	1	0.00	-0.60
SubG	Ultra-Peripheral Node	1	0.00	-0.98
SAG	Ultra-Peripheral Node	1	0.00	-1.33
PAR	Ultra-Peripheral Node	1	0.00	-1.55
OT	Ultra-Peripheral Node	1	0.00	0.60
PERI	Ultra-Peripheral Node	1	0.00	0.48
GU	Ultra-Peripheral Node	1	0.00	0.66
PP	Ultra-Peripheral Node	1	0.00	0.66
ILM	Ultra-Peripheral Node	1	0.00	0.65
LD	Ultra-Peripheral Node	1	0.00	0.42
POST	Ultra-Peripheral Node	1	0.00	0.24
Tea	Ultra-Peripheral Node	1	0.00	0.07
AUDv	Ultra-Peripheral Node	1	0.00	-0.12

Supplementary Table 6 continued

PSTN	Ultra-Peripheral Node	1	0.00	-0.15
SF	Ultra-Peripheral Node	1	0.00	-0.20
AUDp	Ultra-Peripheral Node	1	0.00	-0.35
VISam	Ultra-Peripheral Node	1	0.00	-0.40
ORBm	Ultra-Peripheral Node	1	0.00	-0.46
LP	Ultra-Peripheral Node	1	0.00	-0.57
ILA	Ultra-Peripheral Node	1	0.00	-0.62
VISl	Ultra-Peripheral Node	1	0.00	-0.70
SGN	Ultra-Peripheral Node	1	0.00	-0.75
TU	Ultra-Peripheral Node	1	0.00	-0.81
NB	Ultra-Peripheral Node	1	0.00	-1.17
ACAv	Ultra-Peripheral Node	1	0.00	-1.25
PPN	Ultra-Peripheral Node	1	0.00	-1.40
PBG	Ultra-Peripheral Node	1	0.00	-1.42
LGv	Ultra-Peripheral Node	1	0.00	-1.47
PRT	Ultra-Peripheral Node	1	0.00	-1.51
NLL	Ultra-Peripheral Node	1	0.00	-1.72
SCs	Ultra-Peripheral Node	1	0.00	-1.77
ASO	Ultra-Peripheral Node	1	0.00	-1.79
PST	Ultra-Peripheral Node	1	0.00	-1.83
SPVO	Ultra-Peripheral Node	1	0.00	-1.86
SSp-n	Ultra-Peripheral Node	1	0.00	0.65
SSs	Ultra-Peripheral Node	1	0.00	0.63
FS	Ultra-Peripheral Node	1	0.00	0.60
ZI	Ultra-Peripheral Node	1	0.00	0.56
RR	Ultra-Peripheral Node	1	0.00	0.51
VISpm	Ultra-Peripheral Node	1	0.00	0.35
ECT	Ultra-Peripheral Node	1	0.00	0.20
PL	Ultra-Peripheral Node	1	0.00	0.13
AV	Ultra-Peripheral Node	1	0.00	0.00
SO	Ultra-Peripheral Node	1	0.00	-1.28
CLA	Ultra-Peripheral Node	1	0.00	0.58
VISal	Ultra-Peripheral Node	1	0.00	0.19
GENd	Ultra-Peripheral Node	1	0.00	0.07
VISp	Ultra-Peripheral Node	1	0.00	-0.26
MOB	Ultra-Peripheral Node	1	0.00	-0.32
FRP	Ultra-Peripheral Node	1	0.00	-1.08
LT	Ultra-Peripheral Node	1	0.00	-1.51
IA	Ultra-Peripheral Node	1	0.00	0.56
ORBl	Ultra-Peripheral Node	1	0.00	0.10
MD	Ultra-Peripheral Node	1	0.00	-1.00
TR	Ultra-Peripheral Node	1	0.00	0.31

Supplementary Table 6 continued

PG	Connector Hub	2	0.53	1.21
SBPV	Connector Hub	2	0.49	0.72
RPO	Connector Hub	2	0.49	0.91
SG	Connector Hub	2	0.41	0.79
MEPO	Connector Hub	2	0.37	0.97
PVHd	Connector Hub	2	0.36	0.93
MARN	Connector Hub	2	0.33	1.54
AVPV	Connector Hub	2	0.32	1.69
PVpo	Connector Hub	2	0.31	0.90
CUL	Connector Hub	2	0.31	0.83
SIM	Connector Hub	2	0.31	0.76
GRN	Provincial Hub	2	0.30	1.16
PFL	Provincial Hub	2	0.30	0.99
FL	Provincial Hub	2	0.28	1.22
VNC	Provincial Hub	2	0.25	1.72
MEV	Provincial Hub	2	0.22	0.95
SCH	Provincial Hub	2	0.22	1.22
LC	Provincial Hub	2	0.20	1.37
PARN	Provincial Hub	2	0.15	0.72
IRN	Provincial Hub	2	0.14	0.74
VII	Provincial Hub	2	0.13	0.70
MPO	Non-hub Conn. Node	2	0.63	-0.29
PS	Non-hub Conn. Node	2	0.62	0.29
SH	Peripheral Node	2	0.61	-1.40
MBO	Peripheral Node	2	0.58	0.15
AT	Peripheral Node	2	0.53	-0.94
VI	Peripheral Node	2	0.50	-0.54
EW	Peripheral Node	2	0.50	0.55
IMD	Peripheral Node	2	0.50	0.36
PRP	Peripheral Node	2	0.49	-0.31
LDT	Peripheral Node	2	0.48	-1.18
PAG	Peripheral Node	2	0.47	-1.04
VMH	Peripheral Node	2	0.42	-0.74
PB	Peripheral Node	2	0.41	-0.73
NTB	Peripheral Node	2	0.41	-0.34
SLD	Peripheral Node	2	0.30	-0.91
SUT	Peripheral Node	2	0.30	-0.72
DN	Peripheral Node	2	0.26	-0.75
B	Peripheral Node	2	0.26	-0.47
IP	Peripheral Node	2	0.21	-0.32
PCG	Peripheral Node	2	0.21	-0.09
OV	Peripheral Node	2	0.15	0.32

Supplementary Table 6 continued

CENT	Ultra-Peripheral Node	2	0.00	0.16
AN	Ultra-Peripheral Node	2	0.00	0.43
SOC	Ultra-Peripheral Node	2	0.00	0.27
SLC	Ultra-Peripheral Node	2	0.00	-0.98
PGRN	Ultra-Peripheral Node	2	0.00	-1.20
PRM	Ultra-Peripheral Node	2	0.00	-1.33
x	Ultra-Peripheral Node	2	0.00	-1.33
IC	Ultra-Peripheral Node	2	0.00	-1.40
EPI	Ultra-Peripheral Node	2	0.00	-1.40
SFO	Ultra-Peripheral Node	2	0.00	-1.40
SMT	Ultra-Peripheral Node	2	0.00	-1.40
PR	Ultra-Peripheral Node	2	0.00	-1.60
IAM	Ultra-Peripheral Node	2	0.00	-1.81
PVH	Connector Hub	3	0.45	1.51
RE	Connector Hub	3	0.44	0.83
TRN	Connector Hub	3	0.43	1.37
PVT	Provincial Hub	3	0.18	1.63
VTN	Peripheral Node	3	0.50	0.56
PVp	Peripheral Node	3	0.49	0.04
CS	Peripheral Node	3	0.49	0.06
DTN	Peripheral Node	3	0.48	-0.79
SPA	Peripheral Node	3	0.48	-0.23
MPN	Peripheral Node	3	0.47	0.19
ADP	Peripheral Node	3	0.47	0.05
Ramb	Peripheral Node	3	0.47	0.67
III	Peripheral Node	3	0.47	-0.23
IV	Peripheral Node	3	0.47	-0.28
NI	Peripheral Node	3	0.45	-1.30
AVP	Peripheral Node	3	0.45	-0.37
DMH	Peripheral Node	3	0.43	0.12
PH	Peripheral Node	3	0.42	0.14
PT	Peripheral Node	3	0.42	-0.41
PRNc	Peripheral Node	3	0.38	-3.10
VLPO	Peripheral Node	3	0.37	-0.47

Supplementary Table 7. Each brain region's module and classified role in the female water drinking functional connectivity network.

Region	Category	Module	PC	WMDz
PRP	Connector Hub	1	0.36	0.89
ACVII	Connector Hub	1	0.36	0.86
MEPO	Connector Hub	1	0.45	1.44
PGRN	Connector Hub	1	0.46	1.15
SBPV	Connector Hub	1	0.48	1.73
GRN	Connector Hub	1	0.50	1.09
SG	Connector Hub	1	0.50	1.06
VI	Connector Hub	1	0.50	1.05
NTB	Connector Hub	1	0.54	2.46
SFO	Connector Hub	1	0.56	0.85
MARN	Connector Hub	1	0.56	2.02
GU	Connector Hub	1	0.59	1.12
SCH	Provincial Hub	1	0.00	1.08
AVPV	Provincial Hub	1	0.13	1.83
PB	Peripheral Node	1	0.22	-1.36
OV	Peripheral Node	1	0.29	-0.30
PVpo	Peripheral Node	1	0.29	-0.30
VISam	Peripheral Node	1	0.30	-1.33
SSs	Peripheral Node	1	0.38	-0.19
PVp	Peripheral Node	1	0.44	0.23
PD	Peripheral Node	1	0.45	-1.09
IMD	Peripheral Node	1	0.46	-0.37
EW	Peripheral Node	1	0.46	-0.39
SH	Peripheral Node	1	0.47	0.18
OT	Peripheral Node	1	0.47	-0.45
SPF	Peripheral Node	1	0.47	-0.91
SSp-n	Peripheral Node	1	0.47	0.29
PSTN	Peripheral Node	1	0.47	-0.24
SF	Peripheral Node	1	0.48	-0.93
RPO	Peripheral Node	1	0.48	-0.35
TU	Peripheral Node	1	0.48	0.42
SNc	Peripheral Node	1	0.49	-0.71
SSp-tr	Peripheral Node	1	0.49	-0.02
SSp-m	Peripheral Node	1	0.49	0.54
FRP	Peripheral Node	1	0.49	-0.83
AV	Peripheral Node	1	0.52	-0.08
VISpm	Peripheral Node	1	0.53	-0.22
FS	Peripheral Node	1	0.55	-0.25
AId	Peripheral Node	1	0.55	0.03

Supplementary Table 7 continued

CLA	Peripheral Node	1	0.57	-1.10
SUT	Peripheral Node	1	0.59	-0.25
CEA	Peripheral Node	1	0.59	-0.19
GENd	Ultra-Peripheral Node	1	0.00	-1.57
SSp-bfd	Ultra-Peripheral Node	1	0.00	-1.15
MEV	Ultra-Peripheral Node	1	0.00	-1.11
RR	Ultra-Peripheral Node	1	0.00	-1.11
PPN	Ultra-Peripheral Node	1	0.00	-1.09
VENT	Non-Hub Connector Node	1	0.65	-1.14
CUN	Non-Hub Connector Node	1	0.66	-1.31
B	Provincial Hub	2	0.00	0.84
VTA	Provincial Hub	2	0.00	0.80
DMH	Provincial Hub	2	0.00	0.97
PAG	Provincial Hub	2	0.00	0.73
VLPO	Provincial Hub	2	0.00	0.75
DP	Provincial Hub	2	0.00	0.76
LDT	Provincial Hub	2	0.00	0.93
PCG	Provincial Hub	2	0.00	0.87
SMT	Provincial Hub	2	0.00	0.87
PVHd	Provincial Hub	2	0.00	1.00
PT	Provincial Hub	2	0.00	1.02
PH	Provincial Hub	2	0.00	1.09
AHN	Provincial Hub	2	0.00	0.97
ILA	Provincial Hub	2	0.00	0.88
TRN	Provincial Hub	2	0.02	1.11
MBO	Provincial Hub	2	0.03	0.97
PVT	Provincial Hub	2	0.03	0.88
MPN	Provincial Hub	2	0.03	0.97
MD	Provincial Hub	2	0.03	0.74
LS	Provincial Hub	2	0.05	1.00
MPO	Provincial Hub	2	0.05	0.88
PALc	Provincial Hub	2	0.15	0.74
VMH	Provincial Hub	2	0.17	0.74
RE	Peripheral Node	2	0.06	0.69
TT	Peripheral Node	2	0.06	0.28
ACAd	Peripheral Node	2	0.06	0.09
AT	Peripheral Node	2	0.11	-0.12
ACB	Peripheral Node	2	0.15	0.34
AM	Peripheral Node	2	0.15	0.55
PG	Peripheral Node	2	0.16	0.06
IV	Peripheral Node	2	0.16	-2.12
Alv	Peripheral Node	2	0.17	-0.27

Supplementary Table 7 continued

PALd	Peripheral Node	2	0.18	0.08
PVH	Peripheral Node	2	0.19	0.45
CP	Peripheral Node	2	0.19	-2.24
VTN	Peripheral Node	2	0.21	-1.86
RCH	Peripheral Node	2	0.22	0.29
NI	Peripheral Node	2	0.22	0.48
LHA	Peripheral Node	2	0.24	0.32
SSp-ll	Peripheral Node	2	0.24	-1.97
MSC	Peripheral Node	2	0.24	-0.35
PRNc	Peripheral Node	2	0.25	-0.08
III	Peripheral Node	2	0.26	-2.05
RSP	Peripheral Node	2	0.30	-1.47
AVP	Peripheral Node	2	0.30	-0.26
PRT	Peripheral Node	2	0.32	-2.24
ADP	Peripheral Node	2	0.32	-0.37
DTN	Peripheral Node	2	0.33	-1.85
LPO	Peripheral Node	2	0.33	-0.51
MO	Peripheral Node	2	0.35	-1.39
Ramb	Peripheral Node	2	0.40	-1.80
SPA	Peripheral Node	2	0.41	-1.86
CS	Peripheral Node	2	0.41	-1.97
SSp-ul	Peripheral Node	2	0.46	-2.22
PR	Ultra-Peripheral Node	2	0.00	0.42
ACAv	Ultra-Peripheral Node	2	0.00	0.58
PL	Ultra-Peripheral Node	2	0.00	0.69
MOB	Ultra-Peripheral Node	2	0.00	0.16
AON	Ultra-Peripheral Node	2	0.00	0.35
AOB	Ultra-Peripheral Node	2	0.00	-0.79
SCs	Ultra-Peripheral Node	2	0.00	-0.45
MRN	Ultra-Peripheral Node	2	0.00	-0.35
PRNr	Ultra-Peripheral Node	2	0.00	-0.07
SLC	Ultra-Peripheral Node	2	0.00	0.23
SLD	Ultra-Peripheral Node	2	0.00	0.52
ORBl	Ultra-Peripheral Node	2	0.00	-0.06
PS	Ultra-Peripheral Node	2	0.00	0.70
RN	Ultra-Peripheral Node	2	0.00	-0.12
ORBvl	Ultra-Peripheral Node	2	0.00	-0.11
IAM	Ultra-Peripheral Node	2	0.00	0.62
EPI	Ultra-Peripheral Node	2	0.00	0.67
SCm	Ultra-Peripheral Node	2	0.00	-0.93
ORBm	Ultra-Peripheral Node	2	0.03	0.60
PALv	Ultra-Peripheral Node	2	0.03	0.28

Supplementary Table 7 continued

ILM	Ultra-Peripheral Node	2	0.04	-0.07
EP	Connector Hub	3	0.56	2.25
MEA	Connector Hub	3	0.59	1.74
V	Connector Hub	3	0.62	1.42
VII	Connector Hub	3	0.65	1.28
Alp	Connector Hub	3	0.66	0.83
SNr	Peripheral Node	3	0.24	-0.37
FN	Peripheral Node	3	0.38	-1.85
PIR	Peripheral Node	3	0.50	-1.09
VISC	Peripheral Node	3	0.51	-1.02
BLA	Peripheral Node	3	0.55	0.10
LP	Peripheral Node	3	0.55	0.61
PSV	Peripheral Node	3	0.56	0.40
SO	Peripheral Node	3	0.59	0.08
IA	Peripheral Node	3	0.59	0.35
CA2	Peripheral Node	3	0.61	0.60
AAA	Peripheral Node	3	0.61	0.56
LT	Peripheral Node	3	0.61	-1.58
IRN	Non-Hub Connector Node	3	0.63	-0.53
VP	Non-Hub Connector Node	3	0.63	-0.86
BA	Non-Hub Connector Node	3	0.63	0.61
STN	Non-Hub Connector Node	3	0.65	-1.08
AD	Non-Hub Connector Node	3	0.65	-0.56
CA1	Non-Hub Connector Node	3	0.65	-0.23
SGN	Non-Hub Connector Node	3	0.66	-0.80
LC	Non-Hub Connector Node	3	0.66	-0.44
CENT	Non-Hub Connector Node	3	0.66	-0.44
VISl	Provincial Hub	4	0.00	0.93
VISal	Provincial Hub	4	0.00	1.36
AUDv	Provincial Hub	4	0.00	0.91
AUDp	Provincial Hub	4	0.00	1.24
Tea	Provincial Hub	4	0.00	1.28
PRE	Provincial Hub	4	0.26	0.72
ECT	Peripheral Node	4	0.61	-0.53
LGv	Ultra-Peripheral Node	4	0.00	-1.40
POL	Ultra-Peripheral Node	4	0.00	-1.40
SubG	Ultra-Peripheral Node	4	0.00	-1.40
AUDd	Ultra-Peripheral Node	4	0.00	-1.02
NB	Ultra-Peripheral Node	4	0.00	-1.00
POST	Ultra-Peripheral Node	4	0.00	-0.45
AUDpo	Ultra-Peripheral Node	4	0.00	-0.10
VISp	Ultra-Peripheral Node	4	0.00	0.41

Supplementary Table 7 continued

VISpl	Ultra-Peripheral Node	4	0.00	0.43
PO	Connector Hub	5	0.38	0.76
CUL	Connector Hub	5	0.46	0.97
ENT	Connector Hub	5	0.46	1.25
AN	Connector Hub	5	0.48	1.16
PFL	Connector Hub	5	0.48	1.30
CA3	Connector Hub	5	0.52	0.77
PA	Connector Hub	5	0.52	1.42
LD	Connector Hub	5	0.55	1.11
TR	Connector Hub	5	0.55	0.89
VNC	Connector Hub	5	0.57	0.87
DG	Provincial Hub	5	0.28	1.26
IP	Peripheral Node	5	0.17	-0.33
PBG	Peripheral Node	5	0.36	-1.30
DN	Peripheral Node	5	0.42	-0.48
SIM	Peripheral Node	5	0.43	0.32
SUB	Peripheral Node	5	0.44	0.68
PRM	Peripheral Node	5	0.45	-1.47
IC	Peripheral Node	5	0.47	-1.46
SOC	Peripheral Node	5	0.48	-0.30
PARN	Peripheral Node	5	0.49	0.47
PST	Peripheral Node	5	0.49	-1.14
PAA	Peripheral Node	5	0.49	-0.34
COA	Peripheral Node	5	0.50	-0.66
CN	Peripheral Node	5	0.51	-0.24
PERI	Peripheral Node	5	0.54	0.01
PAR	Ultra-Peripheral Node	5	0.00	-1.77
x	Ultra-Peripheral Node	5	0.00	-1.43
NLL	Ultra-Peripheral Node	5	0.00	-1.31
SPVO	Ultra-Peripheral Node	5	0.00	-0.96
FL	Ultra-Peripheral Node	5	0.00	-0.07

Supplementary Table 8. Each brain region's module and classified role in the female frontloading functional connectivity network.

Region	Category	Module	PC	WMDz
ORBl	Connector Hub	1	0.48	1.24
PERI	Peripheral Node	1	0.19	-0.99
GU	Peripheral Node	1	0.26	0.59
AIv	Peripheral Node	1	0.27	0.58
FRP	Peripheral Node	1	0.46	0.57
AOB	Peripheral Node	1	0.50	-0.13
PST	Ultra-Peripheral Node	1	0.00	-1.86
PIR	Connector Hub	2	0.33	0.98
CEA	Connector Hub	2	0.36	1.30
FS	Connector Hub	2	0.37	0.86
EP	Connector Hub	2	0.39	1.18
PALv	Connector Hub	2	0.42	1.33
MEA	Connector Hub	2	0.43	0.97
BLA	Connector Hub	2	0.44	1.19
IA	Connector Hub	2	0.45	1.11
AAA	Provincial Hub	2	0.30	0.99
SSp-n	Peripheral Node	2	0.12	-0.79
BA	Peripheral Node	2	0.19	-0.39
AId	Peripheral Node	2	0.19	0.49
SSs	Peripheral Node	2	0.21	0.22
AIp	Peripheral Node	2	0.21	0.44
CLA	Peripheral Node	2	0.26	0.23
VISC	Peripheral Node	2	0.27	0.10
PAA	Peripheral Node	2	0.34	-1.07
SSp-m	Peripheral Node	2	0.35	-0.39
RR	Peripheral Node	2	0.39	-1.30
CP	Peripheral Node	2	0.40	0.70
OT	Peripheral Node	2	0.43	-0.03
PALd	Peripheral Node	2	0.44	0.04
STN	Peripheral Node	2	0.45	-1.17
PO	Peripheral Node	2	0.45	-0.09
SSp-tr	Peripheral Node	2	0.45	0.15
POL	Peripheral Node	2	0.46	-2.07
SSp-ul	Peripheral Node	2	0.48	0.11
LD	Peripheral Node	2	0.48	0.60
MO	Peripheral Node	2	0.48	0.58
CA2	Peripheral Node	2	0.48	-0.44
SSp-ll	Peripheral Node	2	0.49	-0.04
SAG	Peripheral Node	2	0.49	-1.84
COA	Peripheral Node	2	0.49	0.31
SubG	Peripheral Node	2	0.63	-2.17

Supplementary Table 8 continued

ECT	Peripheral Node	2	0.63	-2.06
CENT	Connector Hub	3	0.54	0.98
CN	Provincial Hub	3	0.00	1.78
CUL	Provincial Hub	3	0.00	1.05
IC	Provincial Hub	3	0.00	1.75
FL	Provincial Hub	3	0.00	1.78
SIM	Provincial Hub	3	0.20	1.55
PB	Peripheral Node	3	0.27	-0.76
PSV	Peripheral Node	3	0.38	-0.13
VISp	Peripheral Node	3	0.41	-0.10
LC	Peripheral Node	3	0.41	-0.36
PBG	Peripheral Node	3	0.48	-0.09
VISal	Peripheral Node	3	0.50	-0.76
POST	Peripheral Node	3	0.50	-1.08
GENd	Peripheral Node	3	0.50	-0.75
VISpl	Peripheral Node	3	0.50	-0.75
SUT	Peripheral Node	3	0.50	-0.76
VNC	Peripheral Node	3	0.61	-0.36
SSp-bfd	Peripheral Node	3	0.63	-0.73
PFL	Peripheral Node	3	0.65	0.65
SUB	Ultra-Peripheral Node	3	0.00	-1.08
PPN	Ultra-Peripheral Node	3	0.00	-1.08
LGv	Ultra-Peripheral Node	3	0.00	-0.73
SNc	Connector Hub	4	0.50	1.12
CA3	Connector Hub	4	0.53	2.08
LHA	Connector Hub	4	0.54	0.80
CA1	Connector Hub	4	0.56	1.46
PA	Connector Hub	4	0.57	0.95
ILM	Connector Hub	4	0.58	1.67
DG	Connector Hub	4	0.59	1.31
Tea	Peripheral Node	4	0.26	-0.65
AUDd	Peripheral Node	4	0.31	-0.88
PP	Peripheral Node	4	0.33	-0.12
SGN	Peripheral Node	4	0.48	-1.14
VISam	Peripheral Node	4	0.48	-0.96
VP	Peripheral Node	4	0.50	0.68
ZI	Peripheral Node	4	0.53	0.63
LP	Peripheral Node	4	0.55	-0.11
SPF	Peripheral Node	4	0.58	0.66
SNr	Peripheral Node	4	0.61	-1.17
VENT	Peripheral Node	4	0.61	-0.38
ENT	Peripheral Node	4	0.62	-0.66
TR	Peripheral Node	4	0.64	-0.64
MRN	Peripheral Node	4	0.64	0.60

Supplementary Table 8 continued

PAR	Peripheral Node	4	0.65	-0.67
RSP	Peripheral Node	4	0.74	-0.37
AUDpo	Ultra-Peripheral Node	4	0.00	-0.86
NB	Ultra-Peripheral Node	4	0.00	-1.70
AUDv	Ultra-Peripheral Node	4	0.00	-1.12
AUDp	Ultra-Peripheral Node	4	0.00	-0.53
RPO	Connector Hub	5	0.35	1.22
EW	Provincial Hub	5	0.00	1.22
VISl	Ultra-Peripheral Node	5	0.00	-0.82
NTB	Ultra-Peripheral Node	5	0.00	-0.82
MARN	Ultra-Peripheral Node	5	0.00	-0.82
DMH	Provincial Hub	6	0.00	1.06
IAM	Provincial Hub	6	0.00	0.90
LS	Provincial Hub	6	0.00	0.91
AVP	Provincial Hub	6	0.00	1.30
AM	Provincial Hub	6	0.00	0.72
ILA	Provincial Hub	6	0.00	0.81
SMT	Provincial Hub	6	0.00	0.84
ORBm	Provincial Hub	6	0.00	0.87
PT	Provincial Hub	6	0.00	0.93
PVHd	Provincial Hub	6	0.00	1.03
RE	Provincial Hub	6	0.00	1.17
PVT	Provincial Hub	6	0.00	0.81
VMH	Provincial Hub	6	0.00	0.81
SF	Provincial Hub	6	0.00	0.92
PH	Provincial Hub	6	0.04	1.20
MPN	Provincial Hub	6	0.04	1.25
AHN	Provincial Hub	6	0.05	0.70
MSC	Provincial Hub	6	0.08	1.06
PS	Provincial Hub	6	0.09	0.84
MD	Provincial Hub	6	0.15	0.98
MBO	Provincial Hub	6	0.16	0.72
MPO	Peripheral Node	6	0.05	0.50
PVp	Peripheral Node	6	0.06	-0.25
VLPO	Peripheral Node	6	0.07	-0.41
PALc	Peripheral Node	6	0.08	-0.59
AD	Peripheral Node	6	0.09	0.42
PL	Peripheral Node	6	0.17	-0.04
TU	Peripheral Node	6	0.17	-1.55
Ramb	Peripheral Node	6	0.21	0.49
ACAd	Peripheral Node	6	0.23	-0.30
PAG	Peripheral Node	6	0.27	0.56
ACAv	Peripheral Node	6	0.29	0.33
EPI	Peripheral Node	6	0.29	0.27

Supplementary Table 8 continued

ORBvl	Peripheral Node	6	0.31	-1.65
VTA	Peripheral Node	6	0.32	0.17
RN	Peripheral Node	6	0.39	-1.68
TRN	Peripheral Node	6	0.42	-1.37
PG	Peripheral Node	6	0.46	-1.59
AV	Peripheral Node	6	0.55	-1.27
SFO	Ultra-Peripheral Node	6	0.00	-1.56
IMD	Ultra-Peripheral Node	6	0.00	-1.47
PVpo	Ultra-Peripheral Node	6	0.00	-1.15
PD	Ultra-Peripheral Node	6	0.00	-1.82
OV	Ultra-Peripheral Node	6	0.00	-1.57
SH	Ultra-Peripheral Node	6	0.00	-1.34
SCH	Ultra-Peripheral Node	6	0.00	-1.15
AVPV	Ultra-Peripheral Node	6	0.00	-1.14
SBPV	Ultra-Peripheral Node	6	0.00	-0.75
PR	Ultra-Peripheral Node	6	0.00	0.61
TT	Ultra-Peripheral Node	6	0.00	0.54
RCH	Ultra-Peripheral Node	6	0.00	0.55
SPA	Ultra-Peripheral Node	6	0.00	-0.62
MEPO	Ultra-Peripheral Node	6	0.00	-1.14
ADP	Ultra-Peripheral Node	6	0.00	-0.95
PVH	Ultra-Peripheral Node	6	0.00	0.51
AON	Connector Hub	7	0.77	1.48
ACB	Peripheral Node	7	0.50	-0.05
MOB	Peripheral Node	7	0.67	-1.34
LPO	Peripheral Node	7	0.70	-0.08
CS	Connector Hub	8	0.33	0.72
NI	Connector Hub	8	0.35	1.60
LDT	Connector Hub	8	0.41	1.67
III	Provincial Hub	8	0.16	1.17
DTN	Provincial Hub	8	0.25	1.63
AT	Provincial Hub	8	0.26	1.58
VTN	Peripheral Node	8	0.20	0.40
VII	Peripheral Node	8	0.38	0.27
MEV	Peripheral Node	8	0.43	0.04
SO	Peripheral Node	8	0.45	-1.82
SLC	Peripheral Node	8	0.47	-0.87
VI	Peripheral Node	8	0.47	-0.88
PCG	Peripheral Node	8	0.48	0.65
PRNc	Peripheral Node	8	0.48	0.00
PSTN	Peripheral Node	8	0.50	-0.91
GRN	Peripheral Node	8	0.52	-0.18
SLD	Peripheral Node	8	0.53	0.36
PARN	Peripheral Node	8	0.55	-0.79

Supplementary Table 8 continued

SCs	Peripheral Node	8	0.56	0.06
SCm	Peripheral Node	8	0.63	0.37
PRNr	Peripheral Node	8	0.64	-0.30
B	Peripheral Node	8	0.64	0.06
SG	Peripheral Node	8	0.64	-0.81
IRN	Peripheral Node	8	0.67	-0.43
PRT	Peripheral Node	8	0.69	-0.62
PRE	Ultra-Peripheral Node	8	0.00	-1.82
V	Ultra-Peripheral Node	8	0.00	-1.82
IV	Ultra-Peripheral Node	8	0.00	0.68
IP	Connector Hub	9	0.35	0.72
x	Peripheral Node	9	0.16	0.21
SPVO	Peripheral Node	9	0.16	0.22
PRM	Peripheral Node	9	0.16	0.23
FN	Peripheral Node	9	0.36	0.63
DN	Peripheral Node	9	0.37	0.26
PGRN	Peripheral Node	9	0.42	0.45
AN	Peripheral Node	9	0.45	-2.86
PRP	Peripheral Node	9	0.50	0.54
ACVII	Peripheral Node	9	0.53	-0.41