

Week 3 - Doing fMRI experiments

L03-05. How to conduct the actual MRI experiment

Byeol & Hongji

Post-master researcher assistant
and doctoral graduate student
in the Cocoan Lab

12 Mar 2021



L03-05. How to conduct the actual MRI experiment

1. Basic processes

1. Recruit participants
2. set experimental room and MR room
3. get documents from the participants (IRB, MR safety, Participation fee document)
4. give instruction to the participant and attach Biopac electrode
5. (get pre-scan surveys if needed)
6. make sure they don't have to go to the restroom while scanning.. 😊
7. Do the scan!
8. (get post-scan surveys if needed)
9. confirm the participation fee to the participant and get signature on the document
10. say good-bye to the participants!
11. clean up the experimental room and MR room
12. check behavioral/imaging data
13. submit the participation fee document to 행정실, and store other documents



2. How can I arrange my MR time slots?

- Each lab gets given timeslot every month, and the lab members who are currently doing the fMRI experiments can allocate time through discussion (e.g., slack group chats)
- It is recommended to allocate slots first for the most urgent experiments or experiments that are having difficulty to recruit participants.
- If there is not enough time during the weekdays or if there are participants who can only participate on the weekend, check with 최부희 선생님 and reserve the free time on the weekend at the equipment reservation page at CNIR website (<https://cnir.ibs.re.kr/>) with cocoanlab ID.



3. How can I recruit participants?

- Lab manager usually take care of cocoanlab subject recruitment through the Sona system.
- After telling the lab manger the necessary conditions (e.g., in the case of a pain experiments, you need to check the questions related to pain, but if it is not a pain experiment, you don't need to check the condition) get necessary information such as name, heights, weights, phone number, e-mail addresses. Be careful with personal information!

4. How to contact the participants

- Explain the experiment as much as possible by e-mail so that the participants do not run away after they actually arrive and listen to the instruction.
- If the participant wants to participate in the experiment, inform them available timeslots and arrange the experiment.
- Collect necessary information in advance (e.g., check once more if he/she needs MR glasses, if they have braces or holding devices in the mouth)
- Get a copy of their bank account (통장사본) and ID card (여권 사진은 안됨. 주민등록증 또는 운전면허증)
- Contact them one day before the experiment, and if needed, send them pre-scan online survey links. Also, tell them not to drink and sleep enough for the next day's scan.
- There have been several cases that the participants no-show without telling us. It's important to contact them one day earlier and get a reply that they would come by the time.



6. Experimental settings

- Through pilot testing, calculate how much time you need to complete the scan settings (e.g., experiment laptops, Biopac, Eylink, etc)
- There's an instruction file about scan setting manuals.
- There's an instruction file about scan setting check-lists.



L03-05. How to conduct the actual MRI experiment

| 장소 | 기기 | 기능 | 세팅 사항 |
|-------------------------------|---------------------------------|---------------------------------------|--|
| 스캔 준비 실 (모니터 실) | 스캔 operating 컴퓨터 | 스캐너 작동 및 이미지 확인 | PiCo2 protocol, ac-pc 라인 잡아서 'c'에서 -15 (만약 c가 가운데 자리가 아닐 경우 조정), TCS 순서, R>L 일 경우 A>P로 변경 |
| | 프로젝터 (파란색) | 스캔실 모니터에 화면 출력 | 전원 (뒤쪽에 버튼 있음) 연결 후 빨간 불빛 나오는지, 화면 연결되었는지 확인 (간혹 WL01과 연결했을 때 '화면 복제'가 아닌 '화면 확장'이 되어서 노트북에서는 화면이 안 보이는 경우가 있는데, 이 때는 연결 후 스캔실에서 트랙볼 사용해서 '화면 복제'로 설정을 변경해야 함. 그러므로 참가자 오기 전에 미리 연결 여부 확인) |
| | 바이오팩, 바이오팩 용 노트북 (WL02) | 생체신호 기록 (심전도, 피부전도도, 호흡수) | WL04에 연결, 프로그램 켜서 세팅, 매 런 시작 시 trigger 들어오는지 눈으로 확인 |
| | OptoAcoustic (흰색) | 노이즈캔슬링 및 참가자-실험자 의사소통 | 연습 세션에서 calibrate - learning |
| | 싱크박스 (흰색) | 스캔 타이밍 조정 (매우 중요!) | 매 런 시작 전에 켜져 있는지 확인 |
| | 버튼박스 (은색) | 트랙볼 - 노트북 연결 | 트랙볼 쏘고 나서 automatic - trackball - calibration |
| | 실험용 노트북 (WL01) | 실험 진행 MATLAB, 행동 데이터 저장 | 전원 코드, USB port, HDMI 연결, 와이파이 확인 (dropbox), 노트북 비번: Woo86335 |
| 스캔 실 (노란색: 참가자에게 부착 or 확인) | 모니터 (+eyelink 카메라) | 시각 자극 전달 (화면) | |
| | 바이오팩 전극 (ECG 3개, SCR 2개, 호흡 벨트) | 생체신호 기록 (심전도, 피부전도도, 호흡수) | ECG: 가슴 상단에 2개 (왼쪽 가슴: 빨간색, 오른쪽 가슴: 흰색), 왼쪽 아랫배(검정색)에 1개, SCR: 왼손 두번째, 세번째 손가락, 호흡벨트: 고정 후 안 불편할 정도로 세팅 |
| | 트랙볼 | 참가자의 self-report 기록 | 오른손에 패드 받치고 쥐어주기, 필요한 경우 팔 받침대 |
| | 베드 (쿠션 등) | | 발 받침대, 등 패드, 헤드코일에 휴지 깔기, 받침 패드 |
| | 이마 고정 띠 | 머리 움직임 방지 및 참가자가 본인의 움직임 인식할 수 있도록 보조 | 테이핑 아래쪽 평평한 곳에서 시작, 팽팽하게 붙여서 불편한지 참가자에게 물어보기 |
| | emergency ball | 위급상황 시 스캔 중단 | 배 위에 올려주고 정말 긴급할 때 눌러달라고 하기 |
| | 귀마개 | 스캐너 소음 차단 | 포장된 큰 것 말고 반쪽짜리 |
| | 노이즈캔슬링 이어폰 | 스캐너 소음 차단, 스캔 도중에도 실험자의 말 전달 | 귀 불편하지 않도록 맞춰 달라고 하기, 빈틈 휴지로 채우기 |
| | 마이크 | 참가자 말 전달, thought sampling시 사용 | 마이크 방향 확인 (스펀지 짧은 쪽이 마이크) 최대한 참가자 입 주변으로 위치하게 하기 |



6. Experimental settings

- Through pilot testing, calculate how much time you need to complete the scan settings (e.g., experiment laptops, Biopac, Eylink, etc)
- There's an instruction file about scan setting manuals.
- There's an instruction file about scan setting check-lists.

7. After the experiment..

- Organize the experimental room and MR room so that the next experimenter can use it.
- Be careful not to twist the lines. (Pay extra attention not to step on the lines in the MR room; optic fibers are vulnerable to get broken and they are expensive)
- Put every equipment to where it should be (e.g., Biopac, opto-acoustics, pain delivery equipment, etc)
- Close every door before leaving (to prevent strangers from entering the MR room in curiosity)
- If you were the last experimenter of the day, lock the door of the MR room and turn of the lights.
- Check the data and backup (to Dropbox or external HDD)
- Submit the participation fee document to the 행정실 (Pay attention for the personal information)



Lastly..

- All of these contents can be changed depending on the current situation (e.g., participation fee source, related documents, scanner status, etc.)
- Therefore, it is really important to always receive instructions from the person who did the experiment recently, and check every detail with Wani, 최부희 선생님, and other lab members.



Cocoan 101

<https://cocoanlab.github.io>

