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-- Send in your registration and

abstract submission form.

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ASIC 2011

Tenth Annual Summer Interdisciplinary Conference



*Caldes de Boi Spa Resort - Manantial Hotel,
Boi Valley, Pyrenees, Spain.*

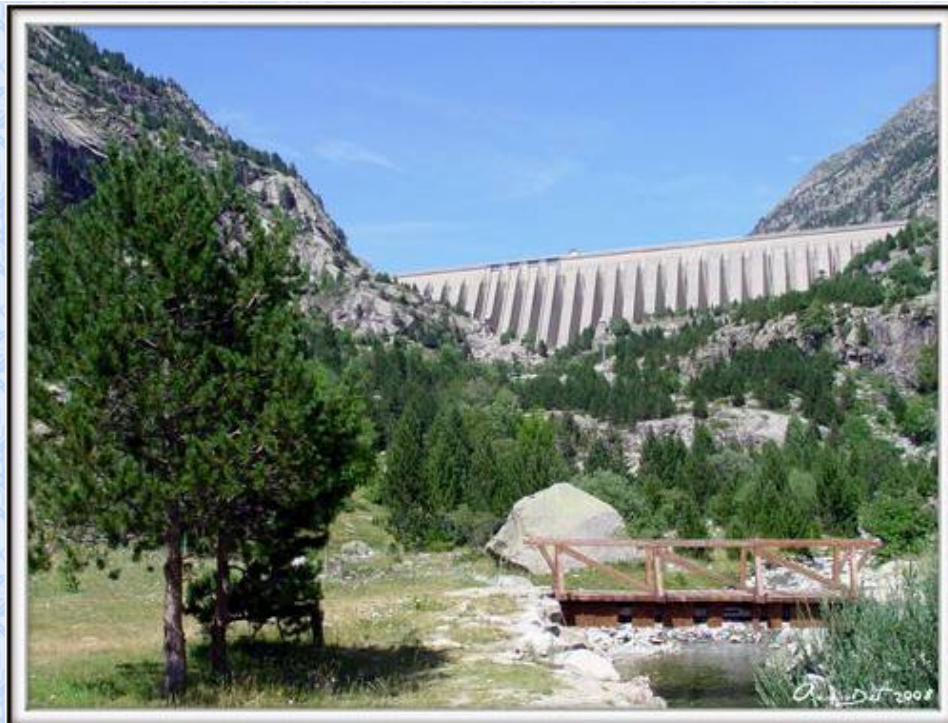
Thursday, July 7  Tuesday, July 12, 2011

Announcing ASIC 2011

The Tenth Annual Summer Interdisciplinary Conference (ASIC 2011) will be held at the Manantial Hotel, part of the Caldes de Boi Spa Resort in the Pyrenees of Spain.

<http://www.caldesdeboi.com/html/boi/>

This hotel is a few hours driving time from Barcelona, in the highest and most remote part of the Spanish Pyrenees, at an altitude of about 1500m, in the midst of peaks rising to over 3000m, and very close to a dam which produces a large lake, both called Cavallers. Here are photos of the dam and lake.



Many outdoor activities are easily accessible, including sport, mixed and traditional rock climbing, mountaineering, hiking, rafting, and more, all starting within a few km of the hotel (see the section on this website: [ACTIVITIES](#)). We will have breakfasts and dinners at the hotel (there are no close alternatives).

ASIC 2011 occurs at a time allowing combined travel to attend two closely related meetings to be held in Boston, MA: 1) The 2011 Annual Meetings of the Society for Mathematical Psychology, July 15-19, and 2) The 2011 Annual Meetings of the Cognitive Science Society, July 20-23, but there is also time to return home first, before a trip to Boston.

Many ASIC attendees will want to take the opportunity before or after ASIC to travel to sites in Spain. Particularly noteworthy is Barcelona, definitely worth a visit.

Richard M. Shiffrin of Indiana University - Bloomington is the organizer: Email correspondence should be directed to _____ or mailed to Richard M. Shiffrin at Indiana University (select 'Contact' from the menu for the address).



The subject matter of the ASIC conferences is interdisciplinary, within the broad frame of Cognitive Science. ASIC uses the very successful format of previous ASIC and AIC conferences: Days are free for leisure activities and discussions among participants. The talks/posters are in the later afternoon/early evening, followed by dinner. The date has been chosen to make it convenient for attendees to bring family/friends. The conference is open to all interested parties, and an invitation is NOT needed to attend. However, due to the small number of spots for speakers, the organizer will select the attendees to give talks, and additional attendees will have the opportunity to present posters.

Previous Years' Websites

Several parts of this year's website are still under construction. For examples of previous years' websites, visit [Previous ASIC Websites](#).

Invitation

The conference is open to all scholars who fit the very general theme of the conference, and their family and friends. An individual invitation is NOT needed. We encourage you to send the conference information to friends and colleagues. If you are interested in organizing a half or whole topic session, contact the organizer.



Conference Aims

The conference will cover a wide range of subjects in cognitive science, including:

- modeling of cognition
- neuroscience, cognitive neuroscience
- psychology (including perception, psychophysics, attention, information processing, memory and cognition)
- computer science and artificial intelligence
- machine intelligence and learning
- methodology and statistics
- linguistics, psycholinguistics and computational linguistics
- philosophy of mind, cognitive science

We especially invite talks emphasizing theory, mathematical modeling, and computational modeling (including neural networks and artificial intelligence). Nonetheless, we require talks that are comprehensible and interesting to a wide scientific audience. Speakers will provide overviews of current research areas, as well as of their own recent progress.



Conference Format

There is a single speaking session each day. If the number of participants exceeds the number of speaking slots (about 42), then the first half session on a day to be chosen will be devoted to posters. Information on submitting proposals for presentations (speaking or posters) is on the page of this website labeled "Talk and Poster Submissions". Please submit talk/poster information on the website, even if you have already sent (some of) this information to the organizer.

The conference will start with registration and a reception from 15:30-16:15 on Thursday, July 7. On subsequent days (except a poster day) there will be drinks and light snacks from ~16:00 - 16:15, followed by a session of seven spoken presentations that include a mid-session drink break. If there is a poster session, drinks and snacks will be available throughout this period.

It will not escape the careful reader that this conference format frees most of the day for either discussions with colleagues or various other activities with colleagues, family, and friends. We expect all scientific attendees and participants to attend all sessions. The time frame will allow day trips to nearby sites, but arrange to return in time for the sessions. Travel to sites and planned activities from which a return for the session will not be possible by 16:00 should be arranged for days preceding and following the conference.

Registration

You are not officially on the request list for presenting research (talks or posters) until you send the registration fee, preferably by Paypal. visit the [Registration page](#) at this website.

Lodging

A block of rooms at the Manantial Hotel are presently being held, but are limited (at the price negotiated, and unreserved rooms will gradually be returned to the general public, so reserve soon. For information visit the [Lodging page](#) at this website.



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Registration Information for ASIC 2011

If you are planning to attend ASIC 2011, please fill out the [registration form](#) and submit your registration fee. This fee pays for rental of the conference room, equipment rentals, snacks and drinks at conference breaks, the opening reception, and the banquet charges.

This year's fee schedule, in US dollars:

By Check or PayPal in US dollars:

Prior to Jan. 1, 2011	\$200
Jan. 1, 2011 - March 1, 2011	\$250
After March 1, 2011	\$300

In addition to the registration fee per person, you may purchase additional guest vouchers for other persons attending the opening reception and/or final banquet. All payments are calculated and paid by clicking on the 'register' link just below:

You need to register to calculate total payment for both payments option

1. Online by PayPal (preferred).
2. Send a check for the correct amount to ASIC 2011, c/o Richard M. Shiffrin, Psychology Dept., Indiana University, Bloomington, IN 47405.

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Submissions of Talks and Posters

Whether you would prefer to give a talk or poster, and whether you have already sent some of this information to the organizer by email, please provide on the link below a list of authors (with the presenter indicated), their affiliations, and emails; a title, and an abstract (limit 250 words). These may be changed later, so do not hesitate to send them as early as possible. The organizer will use these to organize the sessions. Please go to the [submission form](#) to indicate your preference for talks or posters.

The spoken talks will most likely be limited to 30 minutes, a time that includes interruptions for questions, and final discussion. It would be best to plan for twenty minutes of actual speaking. The talks should be aimed not at specialists, but at a general scientific audience. Poster details will be provided later, should a poster session be required.

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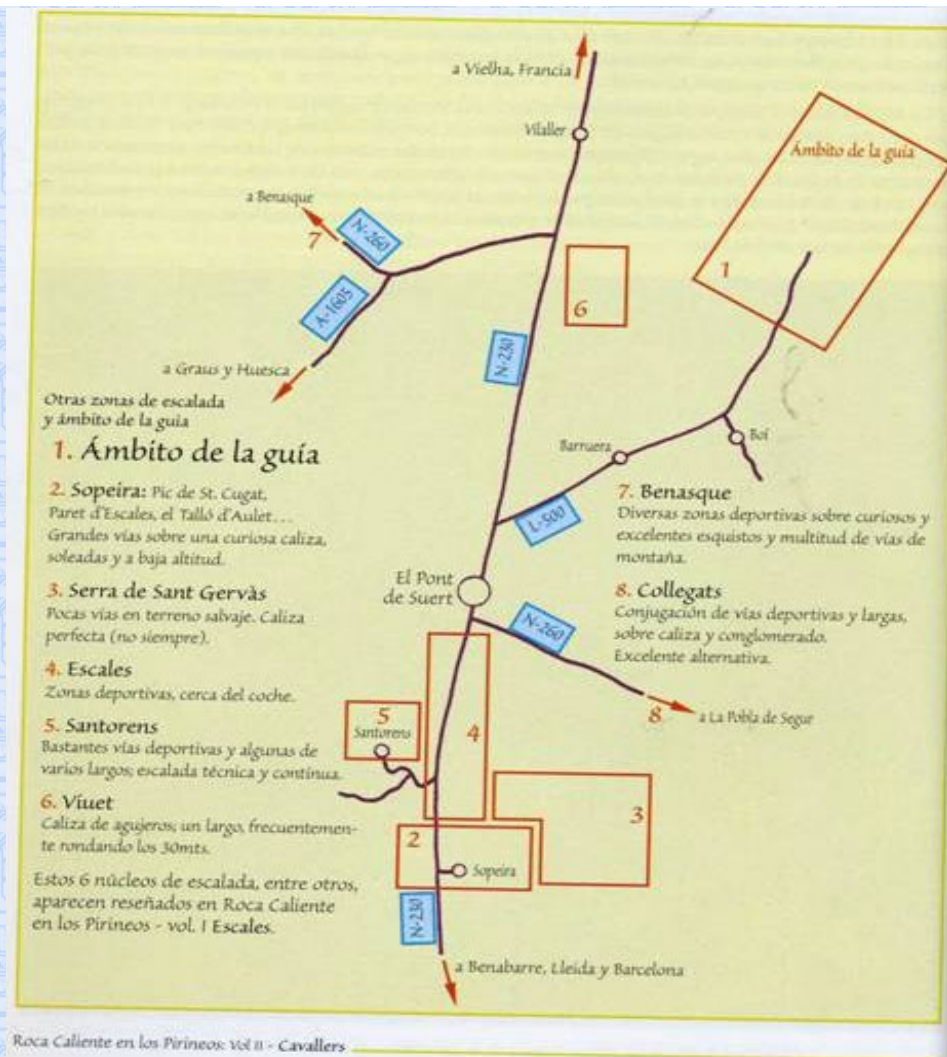


Travel To and About Caldes de Boi Resort, Pyrenees, Spain

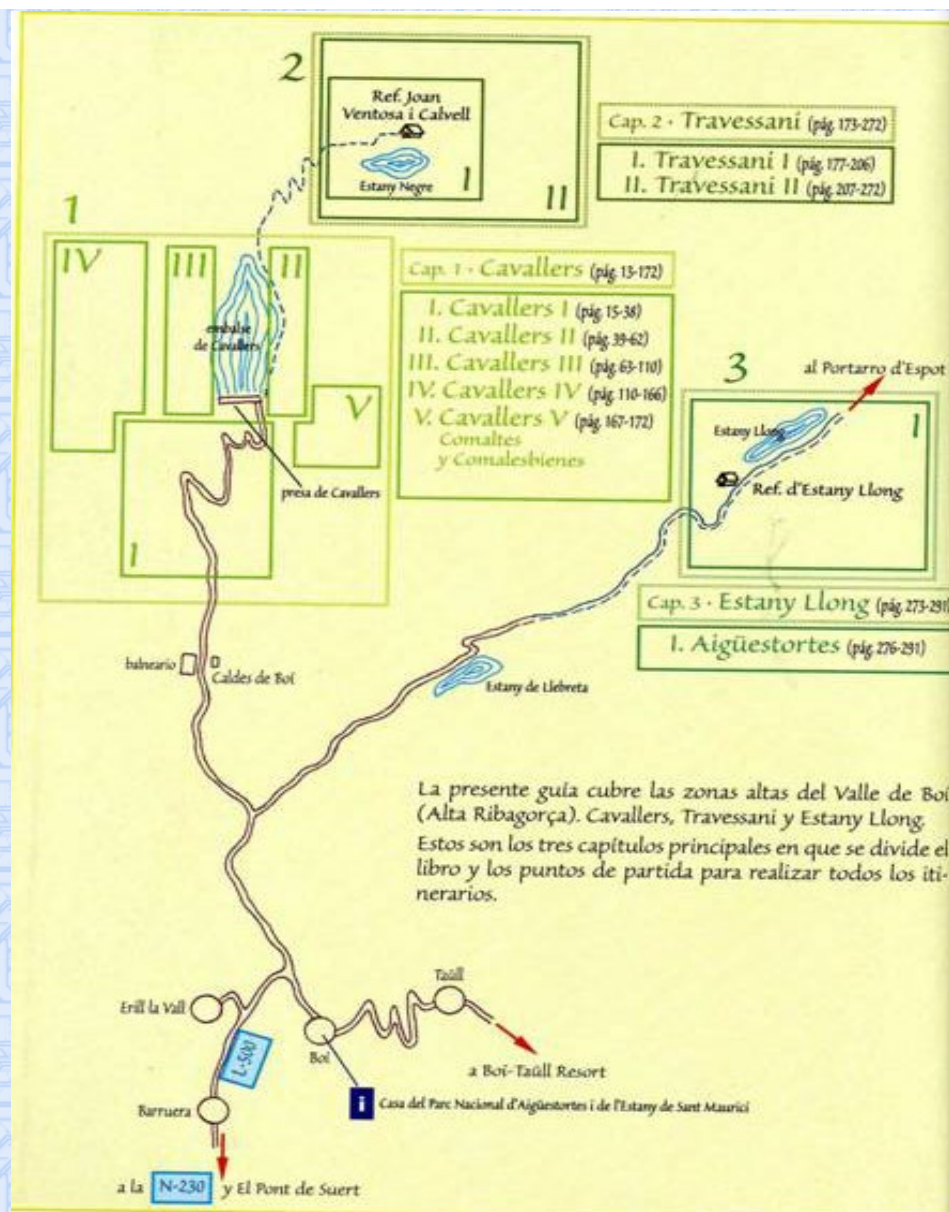
[This section will be elaborated with additional information later]

The hotel website has a link under CONTACT to a map of the region showing the location of the resort. The next two maps are taken from a climbing guidebook to the area. The first is larger scale and shows the location relative to some local roads. The second is smaller scale and indicates the position of Caldes de Boi.

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Roca Caliente en los Pirineos: vol II - Cavallers



Most participants will fly to Barcelona and rent a car to drive to the resort. The driving time is just under four hours. Driving directions from Barcelona: It is probably best to take A2 (some toll roads) to exit 461 to N230 north (bypassing Lleida to the north). Take N230 just past El Pont de Suert, then bearing NE on L-500 past Barruera continuing on LV-5000 to Caldes de Boi.. Google maps provides good driving directions.

Travel to, from, and in Barcelona

Flights from the US usually arrive in Barcelona in the early AM, after an overnight flight the previous evening. Flights to the US from Barcelona leave no later than about 10:30 to 11:30 AM, arriving in the US by early afternoon. If one leaves the resort by about 5 to 6 AM, it might be possible to catch a flight that morning. Otherwise participants might stay overnight in Barcelona, before flying on a later day. I note that many participants will want to spend a day or more likely several days in Barcelona, before or after ASIC, or perhaps both before and after.

There is a closer small airport called Alguaire which is reachable via Paris, Milan, or London. The drive from Alguaire is about 1.5 hours. It is also possible to fly to a French airport near the Pyrenees and cross the Pyrenees by car (with the use of tunnels). Toulouse is one possibility that is about 3.5 hours away by car.

Once one reaches the resort, there is basically one main road. The resort is about three km from the park entrance. There are many hiking and climbing options that begin within a few km of the resort. There are a few unpaved roads into the park, but one must arrange local tours by jeep.

Travel around Barcelona can be complicated, partly because there are many options: taxi, train, bus, and car rental. I will give several useful websites below that give much more detailed information than can be listed here. There are two main travel questions attendees are likely to have: Travel from the airport (BCN) to Barcelona city center, and return, and travel from BCN to Caldes de Boi and return.

1. Travel from BCN to Caldes de Boi, and return

CAR RENTAL: Most attendees will want to use a rental car, which can be obtained at the airport (and arranged via the web or by phone in advance).

PUBLIC TRANSPORTATION: Travel by public transportation from BCN to the resort and return can be done, but is somewhat complicated. Here are the likely steps for the trip to the resort—the return trip more or less reverses the procedures. One must use some combination of tax, train and bus, as described below, to get to the town of Pont de Suert, near the Caldes de Boi resort. From there one must take a taxi for the final stage of the trip, at a cost of about 30 Euro.

In the following note that the origin of trips from Barcelona is at the train station Estaci del Nord/Northern Station which is adjacent to the bus station Bracelona Nord. Trains do not go to Pont de Suert, so it must be reached by bus. Buses can originate at either the above Barcelona bus station, or at the bus station in Lleida (which must first be reached by train from the stations just above). A) Take a train to Lleida. There are two buses a day to Pont de Suert (which I believe are continuations of two of the bus trips from Barcelona next listed). B) Take a bus to Pont de Suert. There are five buses a day to Pont de Suert, taking (depending on route, taking four to five hours). The departure times are 6:45, 9:00, 14:15, 16:00, and 20:45. The return price is about 49 Euro.

The first stage of the trip is to get from BCN to the above mentioned train/bus station. One can use a taxi: from Terminal 2 (T2) the cost is 20 + 25 euros and takes about 25 minutes; from Terminal 1 (T1) the cost is 25 - 30 euros and takes about 30 minutes. Alternatively one can use several train/bus/metro options: See <http://www.barcelona-tourist-guide.com/en/airport/transfers/transfer-barcelona-airport-calella.html>. (You are not going to Calella, but this site will explain the options to get to Barcelona Nord).

2. Travel to and from BCN to Barcelona City Center

There are too many options to list here. A good site that explains the possibilities is: <http://www.barcelona-tourist-guide.com/en/airport/barcelona-airport-transport.html#renfe>.

Some useful websites:

- For bus travel throughout Spain: <http://www.alsa.es/portal/site/Alsa>
Within the ALSA site timetables for bus (BCN-El Pont de Suert) is at: <http://www.alsa.es/portal/site/Alsa/template.PAGE/menuitem.a2b8c42c4264a03c6>
- For train travel in Spain: <http://www.renfe.com/EN/viajeros/index.html>
- For questions about Barcelona and travel within Barcelona: <http://www.barcelona-tourist-guide.com/>
- A general Spain site that could be useful: http://www.spain.info/?l=en_US&gclid=CIDxzsqYp6ICFYp95QodGn7OQw



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Amb la arribada de la Primavera, tornem a ampliar els horaris per poder aprofitar al màxim el Centre Termal.



Lodging

We have placed a hold on rooms sufficient for our conference needs at the Manantial Hotel at the Caldes de Boi Spa Resort in the Spanish Pyrenees adjacent to the Parc Nacional d'Aigüestortes & Estany de Sant Maurici. The hotel website is at:

<http://www.caldesdeboi.com/html/boi/>

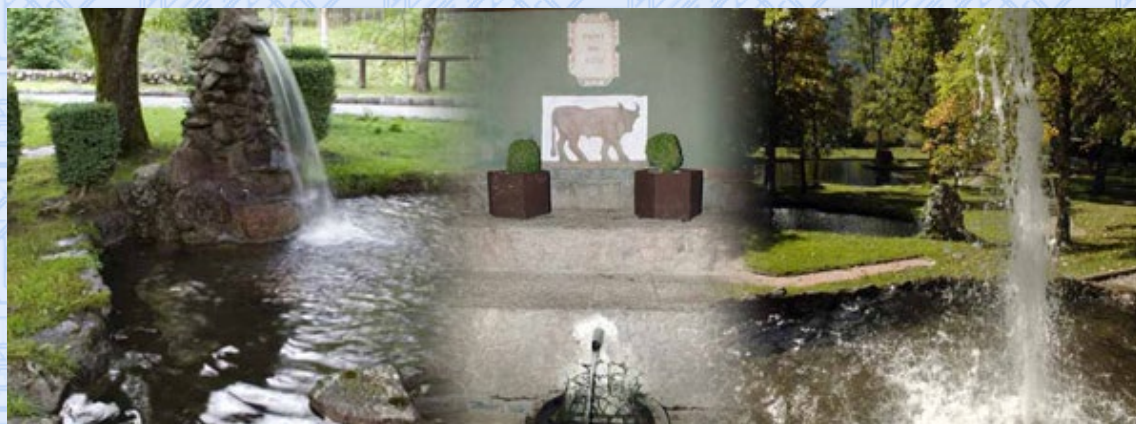
Lodging rates include breakfast and dinner for each person each day. Lodging reservations should be made as early as possible starting in the fall of 2010. Lodging prices: For one person in a room (with either two twin beds or one queen): E120/day. For two persons in a room: E152/day. Other larger rooms available on request.

Bookings can be made by email to:

Hotel El Manantial (4* Hotel)

Afores S/N, 25528 Caldes De Boi, Pyrenees - Catalan, Spain
 4 floors with 3 single rooms, 66 double rooms, 8 family rooms, 8 Junior Suites and 7 Suites. Rooms have Wi-Fi, bathroom, hairdryer, telephone, minibar/fridge, and central heating. There is free outdoor parking.

Guests have access to a bar, gardens, public internet terminal, hot baths and spa, room and laundry services, one indoor and four outdoor swimming pools, a furnished sun terrace, gym, and sauna.



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The resort is famous for hot springs of many types, pools and spa treatments. After a day adventuring in the mountains, and before the talks, it is a nice treat to be able to take a hot mineral bath.



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Food/Dining

There are several restaurants at the Caldes de Boi Spa Resort, and the staff there will be catering all breakfasts and dinners (there is not time to drive to alternative restaurants). The dining charges are included in the daily lodging fee. The registration fee will pay for the food and drink at the session breaks, extra food and drink at the opening reception, and the conference banquet (to be held on a day to be decided later).

Each day the conference will begin with light snacks and liquid refreshments at about 16:00-16:15, followed by talks, and a 15 minute break with more drinks about midway through the talks (about 18:00). The first day of the conference (July 7) will have a reception with wine, beer, and more elaborate snacks, from 3:30-4:15.

The hotel website has information about the restaurants and food. I have arranged that we will have a rotating selection of food choices, including meat, fish, and options for vegetarians.

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Climate, Weather, Clothing

The Caldes de Boi Resort lies at an altitude of about 1500 meters in a range of high mountains (the Pyrenees). The weather in July should be pleasant during the days and cool at night, but as in any mountain setting, one should be prepared for severe weather on occasion. If one goes on hikes or climbs that approach the higher elevations (the tops are above 3000 meters) one can expect to find residuals now here and there on the ground, and one should be prepared for possible wind, rain, and even possible snow. As at any location at altitude, sunburn is a danger, so do not forget sun cream, and consider sun protective clothing. For various adventure outings, specialty clothing may of course be needed (see the link on this website to [ACTIVITIES](#).)

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The general area around the Caldes de Boi Spa Resort and the adjacent Aigüestortes national park offers many activities. (This section of the website will be elaborated as new information is found.)

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There are many websites you might wish to browse, including those of the resort website, the national park, the Val de Boi, and those associated with various activities. I give a selection of these sites below. However, the best single site to start explorations would be Google Earth. Best to begin by downloading a current version (free). Then on the left column you may set your preferences by checking any the various options. For activities near our conference, start by clicking the following placemark that will bring you to the area: [GOOGLE EARTH PLACEMARK](#). If not already checked in the left column of preferences, I suggest checking the following: ,Under Primary Database, check: Borders and Labels, Places, Panoramio Photos, Roads. Then under Gallery, check: Everytrail, Gigapan Photos, Gigapxl Photos, Google Earth Community, NASA, National Geographic Maps, Trimble Outdoor Trips, Wikiloc, You Tube. Wikiloc is particularly useful. Depending on what preferences you choose, and the degree of zooming in you choose, many icons will appear. Clicking an icon, and then clicking on it again when it is selected, will provide detailed information on the contents of the icon, which could be a photo of the area from that vantage point, a hiking trail, a climbing area, a biking route, some point of interest, or similar choices. Note that Google Earth not only allows zooming in and out, but allows 3D rotations so that one gets a good sense of the relief and topography. One can also see topo lines if one desires.

Another good option for exploration is topographic maps in zoomable format at the Institut Cartogràfic de Catalunya: see: <http://www.icc.es/eng/Home-ICC/Home/Cartography>. Once at this website, click Catalogue of large-scale cartography The ASIC area is to the west of Andorra, just to the east of a line connecting el Pont de Suert and Vielha.

GENERAL:

The hotel is in a fairly deep valley (Val de Boi) that extends up to a dam and lake, Cavallers. The Aiguestortes National Park is adjacent to the hotel, just to the east.

HIKING:

There is a great deal of hiking in the area. Many hikes are accessible from the hotel by foot, or after a short drive. These range from relatively short and flat but scenic walks of duration 1-2 hours to multiday hikes. I have selected a number of outstanding possibilities and give some details and photos next. In a few cases the information indicates that the trails are well maintained and obvious. In other cases the situation is less clear, and the way possibly may involve scrambling and directions marked by signposts or cairns. Before setting out on any of these, it would therefore be wise to check locally concerning the nature and difficulty of the route.

Carros del Foc

- See: <http://www.carrosdefoc.com/esp/index.html>
- See: <http://www.summitpost.org/area/range/435492/pirineos-aran-aig-estortes.html>

The longest renowned hike (for attendees coming before or staying after the conference) goes through the heart of the National Park, and connects all the refugios. These refugios are equipped and serve meals (and most have hot showers for a small fee). For superfit hikers, there is a possibility of doing the entire route in one day, called Carros del Foc:

"In 1987 some guards of the huts from the area decided to make the trek in just one day between the refuges. Someone called that the Carros de Foc (Charriots of fire). From then on, in winter or summer, word immediately spreads when someone makes the trek in one day, "Today the Carros de Foc is coming through". The trek still exists today. The itinerary of the Carros de Foc consists of passing the nine refuges which are maintained at the moment: Restanca (2010m)-Colomèrs (2100m)-Saboredo (2310m)-Amitges (2380m)-Ernets Mallafré (1885m)-JM Blanc (2320m)-Colomina (2395m)-Estany llong (2000m)-Ventosa i Calvell (2220m)-Restanca (2010m). Another option is the beginning in Ventosa walking to Restanca across the others."

This round trip is about 50 miles with about 5300m of climbing and descending. Do not attempt this on a conference day. [Photos from various vantage points en route can be found on Google earth].

For hikes during the conference (that will return by 4 PM), or for days before or after when the return time is not limited, there are several long and spectacular hikes that I will describe next. These can be done in time for a return by 4 PM, albeit they might require an early start:

Punta Alta:

- See: http://www.summitpost.org/view_object.php?object_id=192087

This is the high peak, 3014m, just to the east of Lake Cavallers, with a start at 1785m. One walks to the dam (a few km), or drives and parks there. Three routes exist. The route described in the above website is the longest in distance and time, because one first hikes to the Ventosa Refugio (about two hours) and then hikes about 3 hrs more to the top. (The route to the Refugio area is also a separately titled hike "Route of the Groudhog"). Shorter in time is the more direct route east from a start near (south of) the Cavallers dam, following the SSE ridge, over the 'Barranc de Comalesbienes', taking about 3 hrs 30 min. A slightly harder route starting at the same place goes over the S couloir, over the 'Barranc de Comalespada', taking 3 hours 45 minutes. At the conference date there could be some walking on snow, but crampons should not be needed

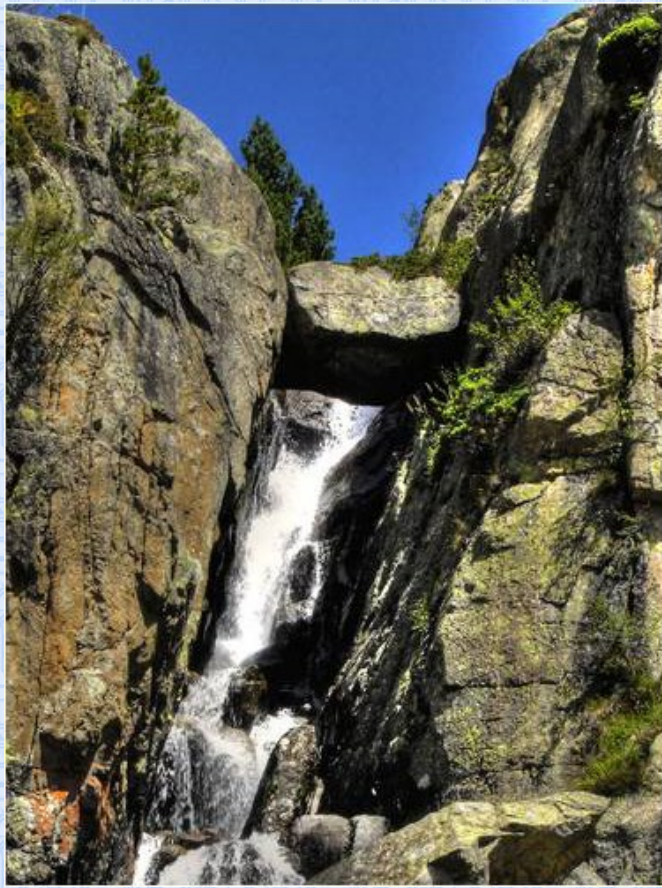




Refugio Ventosa and surround

There is a good trail to the Ventosa Refugio (about two hours—300 m climb and 6 km). The route and the area around the Refugio (Lake Negre) has many points of interest. It is rewarding to continue on a short distance to Lake Travessani, with good views of the peak of the same name, and the ridge with spiky tops.







Aut Peak

- See: <http://naturarea.pleyhades.com/eng/Espanya/Catalunya/ParcsNaturals/Aiguestortes/RutaLAut.php>
- On Google Earth this hike is labeled L' Aud d'Erill

This peak lies to the southwest of the hotel. The trail starts a few km south of the hotel. It is about 4 hrs up and 3.5 hrs return, with about 1135m climbing.



Pic Coma les Torres

This peak and trail may be found on Google Earth. It leaves from the west side of the dam of Lake Cavallers and climbs to the west. It is a difficult hike of five miles, climbing 986 m.



Estany Llong

- See: <http://naturarea.pleyhades.com/eng/Espanya/Catalunya/ParcsNaturals/Aiguestortes/index.php>

This is a longer walk on a maintained trail (10.5 km) along the river Nicholas, with somewhat less elevation gain (820m) that goes to a lake at the center of the national park. It leaves several km south of the hotel, at a parking are to the east of the main road, and takes about 3.5 hrs up, and 2.5 hrs return. A separately titled hike, "Ruta de la Lludriga" (Route of

the Otter) stops along the way at Planell de Aigüestortes, about 1.75 hrs and 140m gain. Once one reaches the Estany Llong there are several peaks around the lake that can be hiked. One is Portarro. From Estany Llong one climbs NE to Portarro d' Espot, then SE to Augulle Portarro. A complete round trip to Portarro would be 22 miles and have about 1360m climbing.





Llubriqueto and beyond

One can hike directly west from Caldes de Boi to the Llubriqueto Plateau, passing waterfalls, and then to lake Gemena, about 3 hrs and 810 m. Another trail goes a little farther and 300m higher to Pic Gemena, about 2552m in altitude. Other trails continue north from Gemena lake toward Besiberi. The trails may be found on Google Earth.



Taull and east

Driving south from Caldes de Boi to Boi, and then a few km east one comes to Taull. Quite a few trails go east from Taull, of various lengths and to various peaks. The Pools of Pessar is one of the shorter, rising 800 m along a good trail GR-11. Consult Google Earth for possibilities and photos.

Other Hikes

Several shorter hikes in the general area of the hotel are described in an English language brochure: ♦Routes and Hikes around Val de Boi♦. This can be obtained at the Boi visitor center. Also see: <http://www.vallboi.cat/en/senderisme/routes-and-hikes-around-vall-de-Boi/routes-and-hikes-around-vall-de-boi>



MAPS

There are a few maps/topos that show hiking trails in the area:

- ISBN 9788480900676: D Aigüestores i Estany de Saint Maurici National Park
- ISBN 1050069: Parc Nacional d'Aigüestortes i Estany de Sant Maurici edited by Alpina at 1:25.000 scale. It is an edition with two maps. (less advisable is a another by Alpina, Vall de Boí, covering a smaller area for the same price).

I have not found how to order it but there is supposed to be a detailed series of maps from the Institut Cartogràfic de Catalunya, one at 1:25000 with good detail: "Parc Nacional d'Aigüestortes i Estany de Sant Maurici".

However, one can access via the web very good topos from the Institut Cartogràfic de Catalunya at various scales (and download copies): see: <http://www.icc.es/eng/Home-ICC/Home/Cartography>. Once at this website, click Catalogue of large-scale cartography. One finds a zoomable map, that can be dragged to different areas. The area we want is to the west of Andorra, just to the east of a line connecting el Pont de Suert and Vielha.

ROCK CLIMBING

A few kilometers from the hotel is the Cavallers sport climbing area. It surrounds the dam and lake of the same name. There are several hundred sport climbs in about seven sectors, all within a few km of the hotel, and accessible with a short walk from parking. These are mostly single pitch but there are also a number of multi-pitch sport climbs. In the same area are many more long multipitch climbs (mostly at moderate or easy difficulty levels) that require some gear placement, though typically equipped with belay and abseiling anchors.

There are two books on Cavallers climbing: For sport climbing near the hotel, one can use *Pyrenees Rock* by Andreas and Katrin Motset. This book covers 13 Pyrenees climbing areas, one of which is Cavallers. It is written in both English and German (facing pages).

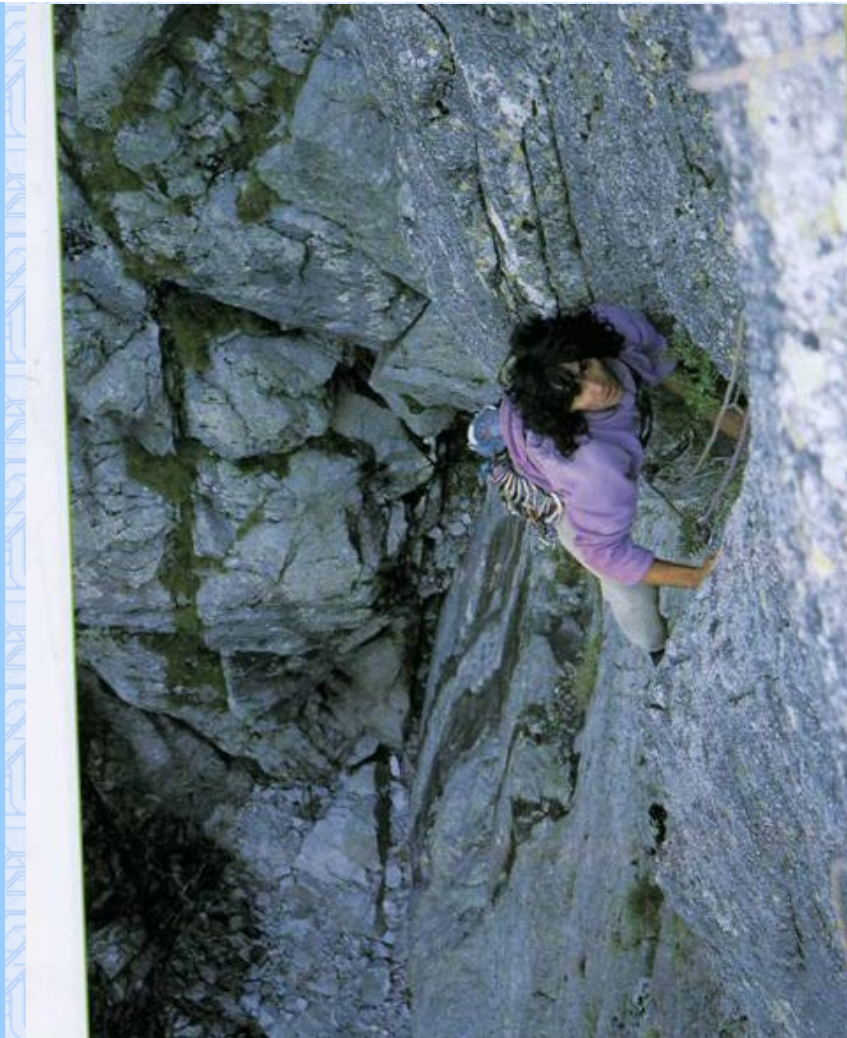
For all types of rock climbing in the Cavallers area there is a nice book written in Spanish: *Roca Caliente en Los Pirineos Cavallers*, by Luis Alfonso and Xavier Buxo. It covers both sport climbing areas (that often contain mixed and traditional climbs as well), and quite long multi-pitch traditional climbs (usually requiring gear placement, although there may be anchors for belaying and rapelling). This book covers three areas one in the vicinity of the hotel and the two others in the National Park. The first 173 pages cover the general area near the Cavallers Dam and Lake (the areas nearest the hotel). This section gives much of the same information as the Motset book but also includes a large number of the multi-pitch longer climbs that are not found in the Motset book. The second section, on pages 173-273, covers the area around Refugio Ventosa and Lake Negre, called Travessani. The Refugio Ventosa is about a two hours walk from the parking at the dam. Given four hours of approaching and returning, the time available for climbing is obviously limited. Nonetheless there is great scenery on the walk to Ventosa, and in the area of the Refugio (see the Hiking Section above), and there is terrific multi-pitch climbing on peaks quite close to the Refugio at very modest difficulty levels. I would therefore recommend at least one day (with an early start) taken to trek to and climb at the Travessani area. The last area covered in the book is in the vicinity of Estany Llong (Lake Llong). The hike to and from

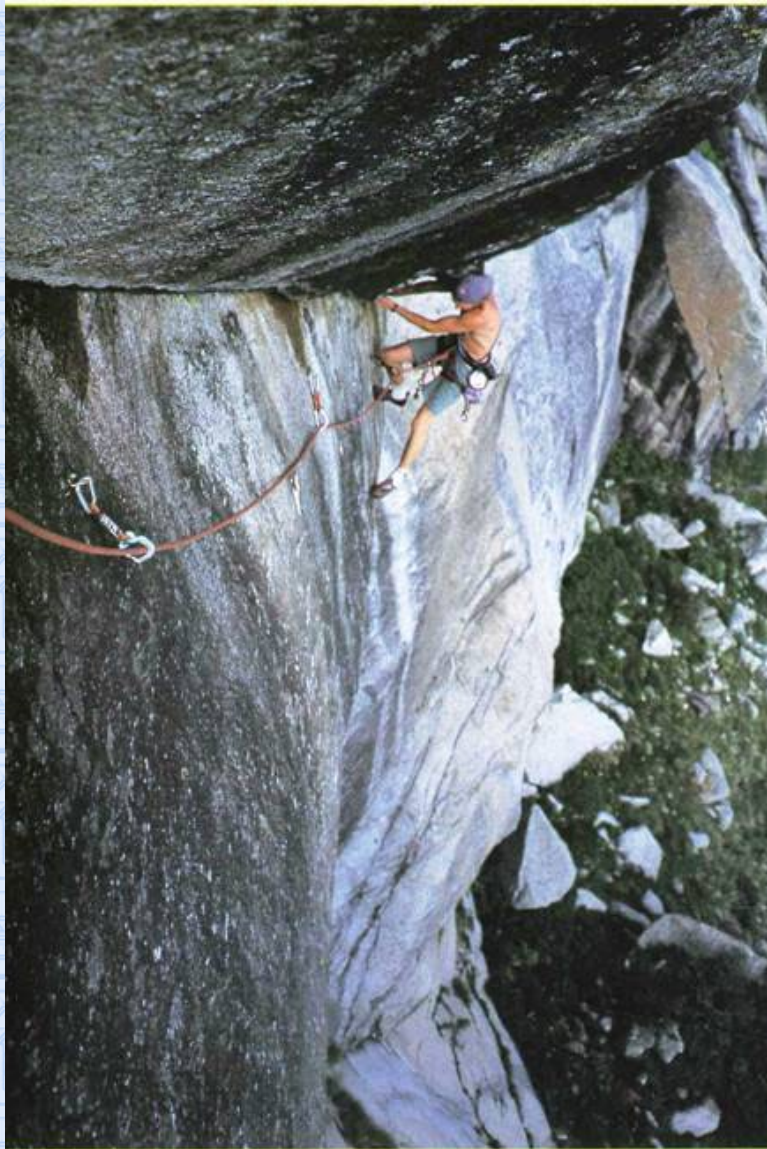
Estany Llong from the nearest parking (south of the hotel see the Hiking Section above) takes about 6+ hours, so is probably too far to visit for climbing (although an excellent target for hikers). There are so many opportunities for climbing of all sorts in the area of the hotel, and in Travessani, that it would take years to explore them all, and no one should worry that the Estany Llong area is probably too far for climbing during the conference. I repeat that this book is particularly valuable because it covers all types of rock climbing (sport, trad, and mixed climbs), from single pitch to 1000+ meters, most of the longer multipitch climbs being of moderate grades.

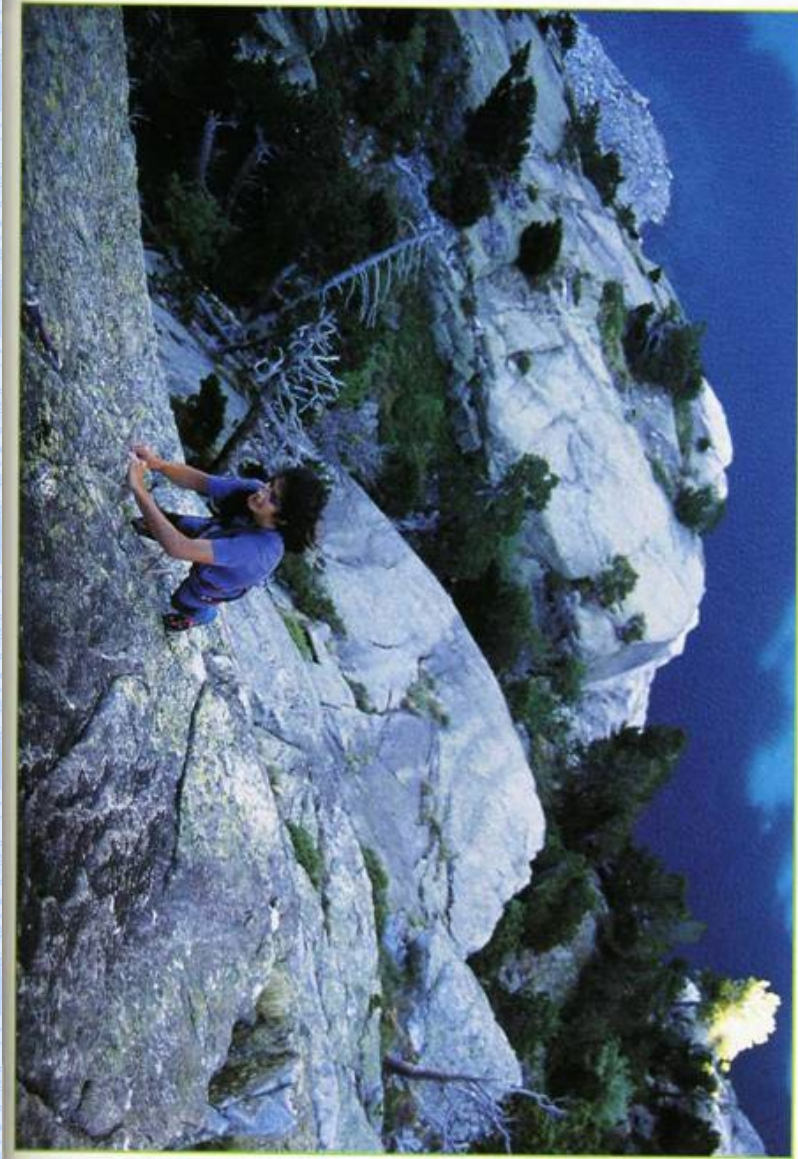
We usually have one or two group climbing days for everyone from beginners wanting to try climbing to experts. [There does not appear to be a local climbing shop, so I will supply information later on means for obtaining gear (for those coming without their own). It is possible that our guide, Guido Bonvicini, will drive to the site with his van containing gear. If this does not work, then another possibility is renting gear in Barcelona, or Lleida en route to the conference.]

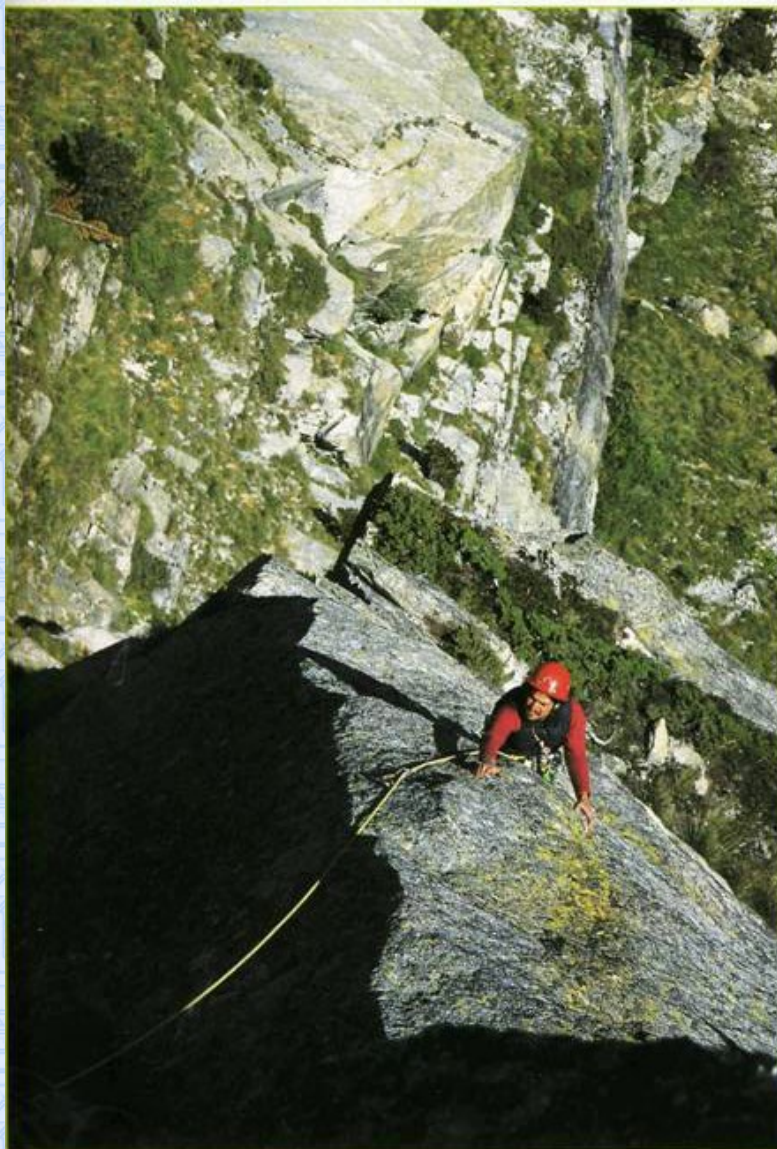
Here are a few pictures to illustrate the possibilities:











BICYCLING

Excellent mountain biking and road biking opportunities exist in the general area of the hotel. Trails of both sorts are given on Google Earth. Some information is given on the Catalonia Sporting site given just below. [I am unsure where local bicycle rentals may be obtained but will try to add this information later.]

CANYONING, RAFTING, CAVING, PARASAILING, VIA FERRATA and more:

I will add more detailed information later, but please see the Catalonian Sporting website at: <http://www.rural-pyrenees-guide.com/catalonia-sports.html>.



SOME OTHER POTENTIALLY USEFUL WEBSITES:

<http://www.caldesdeboi.com/html/boi/>

<http://reddeparquesnacionales.mma.es/en/parques/aiguestortes/index.htm>

http://www.vallboi.cat/en?set_language=en

<http://www.iberianature.com/regions/catalonia/aiguestortes-i-estany-de-sant-maurici/>

<http://www.epyrenees.com/>

<http://www.rural-pyrenees-guide.com/catalonia-parks.html>

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Schedule

There will be a single speaking session each day each with seven talks. These sessions will be held at the Caldes de Boi Spa Resort Conference center, about 50m from the Hotel Manantial. If there are more than 42 presenters, then we will devote one half session or one full session to posters.. Information on submitting proposals for presentations (speaking or posters) is on the page of this website labeled "Talk and Poster Submissions". Please submit talk/poster information on the website, even if you have already sent (some of) this information to the organizer.

The conference will start with registration and a reception at the Conference Center from 3:30-4:15 on Thursday July 7. On subsequent days there will be drinks and light snacks from 16:00 - 16:15, followed by a session of seven spoken presentations that include a mid-session drink break. Dinner will follow the session. One dinner will be the conference banquet (day to be decided later).

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Thursday, July 7

3:30-4:15	Opening Reception, Conference Room	
4:15-5:45	<i>Session: Chair—Dave Huber</i>	
	Anderson, John	Using neural imaging to uncover the sequential structure of thought
	Filimon, Flavia	Perceptual decision making: Disentangling perceptual and motor decisions with event-related fMRI
	French, Bob	TRACX: A Recognition-based connectionist framework for sequence segmentation and chunk extraction
5:45-6:00	Break	
6:00-8:00	<i>Session continued</i>	
	Herzog, Stefan	The benefits of blending cognitive processes within one mind
	Huber, Dave	Transitions from positive to negative short-term word priming: Familiarity, directionality, and expectation
	Jones, Matt	The role of attention in motor control
	Narens, Louis	Putting Steven's methods of magnitude estimation and production on a rigorous measurement-theoretic foundation
8:15	Dinner	

Friday, July 8

4:00-4:15	Refreshments and Snacks, Conference Room	
4:15-5:45	<i>Session: Chair—Marco Zorzi</i>	
	Dougherty, Michael	Tools to theories and back again: Robust prediction in a monotonic world
	Ramsey, Bill	Properly understanding dynamicism in Cognitive Science
	Reder, Lynne	Familiarity of elements affects knowledge formation
5:45-6:00	Break	

6:00-8:00	<i>Session continued</i> Steil, Joachim Where to look next? Proto-objects in a TVA-based computational model of visual attention Ulanovsky, Nachum Neural codes for space in the hippocampus and entorhinal cortex of bats Wierzchon, Michael Comparing measures of consciousness in an artificial grammar learning Task Zorzi, Marco Emergence of a \diamond Visual number sense \diamond in hierarchical generative models
8:15	Dinner

Saturday, July 9

3:45-4:00	Refreshments and Snacks, Conference Room
4:00-6:00	<i>Session: Chair—Rene Zeelenberg</i> Chambaron-Ginhac, Stephanie Impact of retention interval on implicit food memory Cheng, Patricia Applying Causal Learning to Mathematics Education Donkin, Chris The structure of short-term memory scanning: An investigation using response time models Hendrickson, Drew Is categorical perception really verbally mediated perception? Hotaling, Jared Planning in multi-stage risky decision-making
6:00-6:15	Break
6:15-8:15	<i>Session continued</i> Ketels, Shaw Attentional focus and the learning of a complex motor task: The case of snowboarding Murdock, Ben Trial and error learning Neville, David Subliminal processing in long-term memory Sanborn, Adam A rational model of intuitive dynamics Zeelenberg, Rene The effect of study time distribution on learning and retention: A Goldilocks principle for presentation rate
8:30	Dinner

Sunday, July 10

4:00-4:15	Refreshments and Snacks, Conference Room
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4:15-5:45	<i>Session: Chair—Rosie Cowell</i> Cowell, Rosie What is the blood oxygenation level dependent signal? Hills, Thomas Modeling executive processing in information search Sperling, George Measuring both the spatial resolution and the cognitive capacity of visual selective attention
5:45-6:00	Break
6:00-8:00	<i>Session continued</i> Shiffrin, Richard A dynamic activation model for accuracy and response time in recognition memory Cox, Greg Modeling recognition of different stimulus classes with a dynamic activation model Sloutsky, Vladimir Selective attention and categorization: What develops? Wagenmakers, E.J. A Bayesian test for the ♦Hot Hand♦ phenomenon
8:15	Dinner

Monday, July 11

4:00-4:15	Refreshments and Snacks, Conference Room
4:15-5:45	<i>Session: Chair—Eddy Davelaar</i> Davelaar, Eddy Serial recall in SAM Dunn, John The effect of feedback delay and feedback type on perceptual category learning: A state-trace analysis Forstmann, Birte Neural correlates of trial-to-trial fluctuations in response caution
5:45-6:00	Break
6:00-8:00	<i>Session continued</i> Lewandowski, Stephan SOB-CS: An interference model of complex span Nelson, Jonathan Optimality, heuristics, and children's sequential information search Ullman, Shimon Detecting hands: combining learning with innate concepts Ziegler, Johannes How to say ♦No♦ to a nonword: Further explorations of the lexical decision task
8:15	Dinner

Tuesday, July 12

4:00-4:15	Refreshments and Snacks, Conference Room
4:15-5:45	<p><i>Session: Chair—Brad Love</i></p> <p>Jenny, Mirjam The queen of hearts and the ace of spades: Describing conjunctive probability assessment from experience with weighted averaging</p> <p>Love, Brad Forecasting and classification using absolute and rate information</p> <p>Oberauer, Klaus Evidence against decay in verbal working memory</p>
5:45-6:00	Break
6:00-8:00	<p><i>Session continued</i></p> <p>Pezzulo, Giovanni Action understanding through the reuse of one's own skills: A computational model</p> <p>Ramscar, Michael The evolution of noun classification in two Germanic languages</p> <p>Ratcliff, Roger Speed of processing and individual differences</p> <p>Weidemann, Christoph Beyond confidence ratings: How can cognitive states be assessed?</p>
8:15	Dinner

ASIC 2011

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Authors, Titles, Abstracts

(When sufficient titles, and abstracts for talks and posters arrive, I will begin posting them in this section)

Listing by speaker

A | B | C | D | E | F | G | H | I | J | K | L | M | N | O
P | Q | R | S | T | U | V | W | X | Y | Z

A

Speaker's Name: John Anderson
First Author's Name: John Anderson
First Author's Affiliation: Carnegie Mellon
Title: Using Neural Imaging to Uncover the Sequential Structure of Thought
Abstract: Traditional experimental methods that use data averaging have never been well suited for the study of complex problem solving because of the high variability in trial-to-trial behavior. While there has been much progress in fitting models to single-trial latency and accuracy data in non-problem-solving domains, these approaches offer little information about the different problem-solving paths that participants may be taking in a trial that can last for the minutes. We will describe how we can combine multivariate pattern analysis and Hidden Markov models to track the second-by-second thinking of participants while they solve complex problems. Illustrations will include applications to predicting the behavior of students as they interact with intelligent tutoring systems and assessing the fit of alternative models to the problem-solving behavior of participants.

C

Speaker's Name: Stephanie Chambaron-Ginhac
Add. Speaker's Name: Claire Sulmont Rosse
First Author's Name: Stephanie Chambaron-Ginhac
First Author's Affiliation: CO3 -ULB and UMR CSGA, INRA - Dijon
Second Author's Name: Pauline Defacq
Second Author's Affiliation: UMR CSGA, INRA - Dijon
Third Author's Name: Xavier Virely
Third Author's Affiliation: UMR CSGA, INRA - Dijon
Fourth Author's Name: Sylvie Issanchou
Fourth Author's Affiliation: UMR CSGA, INRA - Dijon
Fifth Author's Name: Claire Sulmont Rosse
Fifth Author's Affiliation: UMR CSGA, INRA - Dijon
Title: Impact of retention interval on implicit Food Memory
Abstract: Studies on Odor Memory reveal that our memory for odors is excellent and that odors have an extraordinary ability to

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remind us of long-forgotten events (Engen, 1987). But what is the impact of time and delay on Food Memory? This question is particularly interesting because food preference and food rejection acquisition are based on both learning and memory mechanisms. Consequently, the objective of the present research was to study the impact of the retention interval between an implicit learning phase of a food model (orange juice) and a recognition phase. In our study, we manipulated the delay of the retention interval: one hour, one day and one month. 91 participants were recruited to participate in this study. The first part consisted of an implicit learning phase of the orange juice model. During the second part, participants took part in two tests: a recognition test on the orange juice model and a discrimination test of this same orange juice. On the basis of the results it can be concluded that, contrary to odor memory, the longer is the retention interval between the learning and the test phases, the less efficient participants are in the recognition task. Moreover, in the Group +1 hour, it seems that there is no consolidation of the memory trace whereas, a reactivation of the memory trace appears in the Group + 1 month.

Speaker's Name:	Patricia Cheng
First Author's Name:	Jessica Walker
First Author's Affiliation:	UCLA
Second Author's Name:	Patricia Cheng
Second Author's Affiliation:	UCLA
Title:	Applying Causal Learning to Mathematics Education
Abstract:	Students who are familiar with the analytic and procedural knowledge relevant to solving a mathematics problem may nonetheless fail to solve it, especially when the problem appears novel. In studies testing university and community college students, we presented instruction materials on high-school algebra structured to enable learners to experience both their inability to solve a problem and their ability to solve similar problems. The students were encouraged to compare problems showing a contrast, a change in the value of a cause associated with a change in the value of the effect, with potentially confounding factors kept constant. The goal of the materials was to provide learners with the requisite information for formulating the causes of their failures and the removers of the causes, thereby enabling them to gain insight into why the analytic and procedural knowledge they were taught years earlier are useful. A delay test on transfer to novel problems showed that students in the contrast condition were dramatically more successful than students in a control condition who received identical instructions in a traditional form. Follow-up studies ruled out alternative explanations such as heightened motivation due to the experience of failure and general enhancement of learning due to comparisons. The causal approach aims to encourage mathematical reasoning and understanding of problem-solving procedures.

Speaker's Name:	Rosemary Cowell
First Author's Name:	Rosemary Cowell
First Author's Affiliation:	University of California San Diego

Title: What is the Blood Oxygenation Level Dependent Signal?

Abstract: I will present a brief overview of the current understanding of the blood-oxygenation-level-dependent (BOLD) signal measured by functional Magnetic Resonance Imaging (fMRI). This popular neuroimaging technique uses MRI to detect changes in the level of oxygenated hemoglobin in the blood that perfuses brain tissue, while subjects perform a cognitive task. It is assumed that changes in oxygenation of the cerebral blood reflect changes in neural activity. Factors influencing changes in the BOLD signal include changes in cerebral blood flow (CBF) and changes in the cerebral metabolic rate of oxygen (CMRO2). Neither of these factors is an infallible proxy for neural activation and, in addition, these factors can interact in response to changes in the physiological and cognitive state of the subject. I will discuss some experimental methods for teasing apart the contributions of these factors, such as Arterial Spin Labeling (ASL) for measuring CBF, and CO2 calibration for estimating CMRO2. These methods can be used to build a model of the BOLD signal, in order to better understand this widely-used dependent variable.

Speaker's Name: Greg Cox
First Author's Name: Greg Cox
First Author's Affiliation: Indiana University
Second Author's Name: Richard Shiffrin
Second Author's Affiliation: Indiana University

Title: Modeling recognition of different stimulus classes with a dynamic activation model

Abstract: We carried out an episodic recognition memory study with radically varying stimulus classes of varying levels of background experience (e.g., familiar common objects and novel random dot patterns), with one item studied from each class. Given that novel objects are less familiar than common ones, a fixed criterion model of recognition decisions would predict strong biases to respond "old" to common items and "new" to novel items. Contrary to this prediction, the results are dominated by a mirror effect wherein novel items are less discriminable, but not uniformly rejected. We fit accuracy and response time with a new model that posits that recognition decisions are the product of dynamic changes in familiarity as features are extracted from the test probe, thus making the decision invariant with respect to the absolute familiarity of the item. Positive changes from one moment to the next are added to an "old" accumulator and negative changes to a "new" accumulator; the first accumulator to reach threshold governs the response and its latency. This model predicts and explains the observed performance in both accuracy and response time across disparate item classes as a function of the similarity within and between item classes.

D

Speaker's Name: Eddy Davelaar
First Author's Name: Eddy Davelaar
First Author's Affiliation: Birkbeck, University of London
Title: Serial recall in SAM
Abstract: I will present a modification to SAM that allows it to deal with serial recall data. To do this, some core assumptions of

SAM needed to be adjusted including its retrieval structure. I therefore call this model SAM-SR for convenience. After describing the initial results on serial recall, I will focus mainly on how SAM-SR provides a reinterpretation of listlength effects, output order, rehearsal, contiguity effects, and retrieval times.

Speaker's Name: Chris Donkin
First Author's Name: Chris Donkin
First Author's Affiliation: Indiana University
Second Author's Name: Robert Nosofsky
Second Author's Affiliation: Indiana University
Title: The structure of short-term memory scanning: An investigation using response time models
Abstract: The way in which information is retrieved from short-term memory has a long history of investigation. There is, however, still no consensus on whether items in short-term memory store are accessed serially, or in parallel, or whether the entire memory store is utilized to make recognition judgements. In the current investigation, we compare models of choice response times arranged into various architectures (serial exhaustive, parallel self-terminating, and global access) on their ability to account for choice and response time distribution data. We find that, despite provided an intuitive explanation for various qualitative patterns in mean response times, the serial exhaustive model struggles to account for the shape of response time distributions.

Speaker's Name: Michael Dougherty
First Author's Name: Michael Dougherty
First Author's Affiliation: University of Maryland
Second Author's Name: Rick Thomas
Second Author's Affiliation: University of Oklahoma
Title: Tools to theories and back again: Robust prediction in a monotonic world
Abstract: Two fundamental goals of the social sciences are description and prediction: Researchers and practitioners desire models that both describe the latent structure of data and predict new observations. Within the social sciences, these two goals have traditionally been addressed through formal statistical modeling, typically using multiple regression or one of its many variants. In this paper, we introduce a novel algorithm for description and prediction inspired by research in cognitive science and the development of the take-the-best heuristic for human judgment. Our algorithm, dubbed the general monotone model (GeMM) blends ideas from the areas of cognitive science, knowledge discovery and data mining, and statistics. We compare our algorithm to other statistical and prediction algorithms using both simulated and real data to illustrate its ability to effectively recover latent data structures and predict new observations while exhibiting extraordinary robustness to transformation.

Speaker's Name: John Dunn
First Author's Name: John Dunn
First Author's Affiliation: University of Adelaide

Second Author's Name: Ben Newell
Second Author's Affiliation: University of New South Wales
Third Author's Name: Michael Kalish
Third Author's Affiliation: University of Louisiana at Lafayette
Title: The effect of feedback delay and feedback type on perceptual category learning: A state-trace analysis
Abstract: Evidence that learning rule-based and information-integration category structures can be dissociated across different variables has been used to support the view that such learning is supported by multiple learning systems. Across four experiments we examine the effects of two variables, feedback delay and feedback type, that have previously been shown to dissociate learning of the two types of category structure. Our aim was twofold; first, to determine whether these dissociations meet the more stringent inferential criteria of state-trace analysis; and second to determine whether they are determined by properties of the different category structures or by properties of the task. Experiments 1 and 2 examined the effect of feedback delay and feedback type on learning rule-based and information-integration category structures. We confirmed that feedback delay dissociated these different kinds of learning and that this met the state-trace criteria. We were unable to confirm a similar effect for feedback type. Experiments 3 and 4 examined whether the effect of delay is moderated by the similarity of an intervening mask to the stimulus set. When this similarity is reduced, delay did not dissociate rule-based and information-integration learning and the state-trace criteria were no longer met. These results pose important challenges to models of category learning that propose multiple distinct learning systems.

F
Speaker's Name: Flavia Filimon
First Author's Name: Flavia Filimon
First Author's Affiliation: Freie Universität Berlin
Second Author's Name: Niels A. Kloosterman
Second Author's Affiliation: Universiteit van Amsterdam
Third Author's Name: Jonathan D. Nelson
Third Author's Affiliation: Max Planck Institute for Human Development
Fourth Author's Name: Marios G. Philiastides
Fourth Author's Affiliation: Freie Universität Berlin
Fifth Author's Name: Hauke R. Heekeren
Fifth Author's Affiliation: Freie Universität Berlin
Title: Perceptual decision making: disentangling perceptual and motor decisions with event-related fMRI
Abstract: Perceptual decision making involves categorizing a percept based on noisy sensory evidence. For instance, one might decide if a degraded image represents a dog versus a cat, or a face versus a house. The relationship between perceptual decisions and motor preparation has been debated recently. Are perceptual decisions implemented in the same sensorimotor networks used to indicate one's choice, or do separate regions implement perceptual decisions? Several recent single-unit recording and fMRI studies have claimed that sensorimotor regions such as the lateral intraparietal area

(LIP) implement not just eye or hand responses, but also the perceptual decisions themselves. However, the vast majority of these studies suffer from motor preparation confounds, as specific motor responses were pre-assigned to perceptual categories. It could be that, rather than accumulating sensory evidence towards perceptual decisions, these regions are instead planning the motor response associated with the percept. Using an event-related fMRI design, we disentangle motor preparation and perceptual decision making involving noisy face and house stimuli. Human subjects decide if a noisy image represents a face or a house, without knowing in advance how they will respond (hand or eye) or where the motor target (above, below, left, or right) will be located. Our results show a network of prefrontal cortical areas to be involved in perceptual decisions, including inferior frontal gyrus and sulcus, and dorsolateral prefrontal cortex, independent of motor preparation.

Speaker's Name:	Birte Forstmann
First Author's Name:	Birte Forstmann
First Author's Affiliation:	University of Amsterdam
Title:	Neural correlates of trial-to-trial fluctuations in response caution
Abstract:	Trial-to-trial variability in decision making may be attributed to either variability in information processing or variability in response caution. In this paper we study which neural components code for trial-to-trial response caution adjustments using a new computational approach that quantifies response caution on a single-trial level. We found that the fronto-striatal network dynamically regulates the amount of response caution. However, different frontomedial regions are involved in signaling the necessity of the updating process. When participants were required to respond quickly, we found a positive correlation between single-trial response caution and the hemodynamic response (HR) in presupplementary motor area and dorsal anterior cingulate. In contrast, on trials that require a change from speed to accuracy or vice versa, we found a positive correlation between response caution and HR in anterior cingulate proper. These results indicate that on every trial response caution is set through cortico-basal ganglia functioning, but that trials differ according to the mechanisms that trigger response caution.

Speaker's Name:	Robert M. French
Add. Speaker's Name:	Caspar Addyman
Add. Speaker's Name:	Denis Mareschal
First Author's Name:	Robert M. French
First Author's Affiliation:	University of Burgundy, France
Second Author's Name:	Caspar Addyman
Third Author's Name:	Denis Mareschal
Title:	TRACX: A Recognition-Based Connectionist Framework for Sequence Segmentation and Chunk Extraction
Abstract:	Individuals of all ages and all cultures extract structure from the sequences of patterns they encounter in their environment, an ability that is at the very heart of cognition. One of the most widely accepted explanatory mechanisms

that have been proposed is learning based on prediction. The idea is that individuals are constantly engaged in predicting upcoming patterns in their environment based on previously encountered patterns. Learning, in this view, is a process of gradually aligning these predictions with the outcomes that actually occur. Prediction-driven learning is the cornerstone of numerous computational models of sequence processing, and, in particular, the very well-known simple recurrent network (SRN, Elman, 1990). However, it turns out that prediction-driven models, in general, and the SRN, in particular, cannot account for a number of recent results in infant statistical learning and adult implicit learning. An alternative connectionist model, called TRACX (Truncated Recursive Autoassociative Chunk eXtractor), based, not on prediction, but on the recognition of previously (and frequently) encountered sub-sequences of patterns (chunks) will be presented that is able to handle empirical data that is problematic for prediction-based models. TRACX also accounts for a wide range of other empirical results. The main suggestion arising from this work is that recognition memory, not prediction, underlies sequence segmentation and chunk extraction.

H

Speaker's Name:	Andrew Hendrickson
First Author's Name:	Andrew Hendrickson
First Author's Affiliation:	Indiana University
Second Author's Name:	George Kachergis
Second Author's Affiliation:	Indiana University
Third Author's Name:	Todd Gureckis
Third Author's Affiliation:	New York University
Fourth Author's Name:	Robert Goldstone
Fourth Author's Affiliation:	Indiana University
Title:	Is categorical perception really verbally mediated perception?
Abstract:	Recent research argues that categorization is strongly tied to language processing (Lupyan, 2008). Verbal category labels have been shown to have an on-line influence on perceptual discriminations of well-learned categories: color (Winawer et al., 2007), shape (Lupyan, 2009), and facial emotion (Roberson & Davidoff, 2000), as well as familiar and unfamiliar faces (Kikutani et al. 2008; 2010). Does this imply that categorical perception (CP) is essentially verbally-mediated perception? Gureckis & Goldstone (2008; in review) demonstrate CP can occur even in the absence of overt labels when categories contain non-homogenous internal structure. Recent work (Hendrickson et al., 2010) extended these findings to investigate whether interference tasks (verbal, spatial) reduce the effect of learned CP for complex visual stimuli (faces). Contrary to the previous findings with well-learned categories, these results show that a verbal interference task does not disrupt learned categorical perception effects for faces. The current work extends these findings to show that the within-category CP effect persists despite increasing participants' reliance on verbal labels by manipulating the verbal salience of the stimuli, the manner of response, and the difficulty of the verbal interference task. Additionally, we find that within-category CP shows the same pattern of

asymmetries as between-category CP (Hanley & Roberson, 2011). Our results are interpreted in light of the ongoing debate about the role of language in categorization. In particular, we suggest that at least a subset of categorical perception effects may be effectively \diamond language-free \diamond across a wide array of manipulations. Keywords: Perceptual Learning, Categorization, Concept Learning, Language.

Speaker's Name: Stefan Herzog
First Author's Name: Stefan Herzog
First Author's Affiliation: University of Basel, Department of Psychology
Second Author's Name: Bettina von Helversen
Second Author's Affiliation: University of Basel, Department of Psychology
Title: The benefits of blending cognitive processes within one mind
Abstract: Two kinds of cognitive processes for judging quantities and categorizing objects have been contrasted in cognitive science: rule-based processes, which use abstracted cue knowledge, and exemplar-based processes, which use similarity to previously encountered cases to make judgments and categorizations. Although some models assume that the two processes compete against each other, other models assume that they are blended into a joint judgment. Based on cross-validated simulations in 43 large real-world domains we show that blending (i.e., averaging) the outputs of rule- and exemplar-based processes (quantities or posterior probabilities) generally leads to more accurate judgments and categorizations as compared to: (a) exclusively relying on either rule- or exemplar-based processes or (b) trying to select the more accurate process based on past learning experience. We discuss these results in light of parallel results found and statistical rationales proposed in machine learning research, as well as in light of the major classes of judgment and categorization models in cognitive science \diamond specifically with respect to what interaction between rule- and exemplar-based processes they assume.

Speaker's Name: Thomas Hills
Add. Speaker's Name: Tim Pleskac
Add. Speaker's Name: Ralph Hertwig
First Author's Name: Thomas Hills
First Author's Affiliation: University of Basel
Second Author's Name: Tim Pleskac
Second Author's Affiliation: Michigan State University
Third Author's Name: Ralph Hertwig
Third Author's Affiliation: University of Basel
Title: Modeling executive processing in information search
Abstract: Recent work on individual differences in information search reveals that people reliably differ in how they mediate local versus global search policies (i.e., exploration versus exploitation). Some individuals tend to stay longer in a local region of the information space, while others switch frequently between different local regions. These may represent differences in executive processing, as they are observed across a variety of domains, including spatial search and problem solving (Hills, Todd, & Goldstone, 2008), memory search (Hills & Pachur, in review), and external

information search among gambles (Hills & Hertwig, 2010). Furthermore, switching is predictably associated with working memory capacity, with low capacity individuals switching more frequently than high capacity individuals. We investigated people searching for information prior to making a decision between two monetary gambles, each gamble associated with a different payoff distribution. Following a period of unconstrained information search, participants could freely explore options and observe payoffs. Participants made a final decision and received its associated payoff. Across multiple studies, we consistently found that switching behavior and total samples taken are highly correlated. To evaluate this behavior from a cognitive perspective, we developed and compared models based on hierarchical goal structures, to determine whether this behavior is better represented as a central executive or executive committee like process, that is, are switching and total sample size better represented as dependent or independent processes? Finally, we compare the resulting parameter fits with measures of participant's working memory capacity.

Speaker's Name:	Jared Hotaling
First Author's Name:	Jared Hotaling
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Second Author's Name:	Jerome Busemeyer
Second Author's Affiliation:	Indiana University
Third Author's Name:	Richard Shiffrin
Third Author's Affiliation:	Indiana University
Title:	Planning in Multi-Stage Risky Decision-Making
Abstract:	Research into risky decision-making has traditionally presented individuals with choice alternatives that provide an immediate reward or punishment based on the outcome of a single random event. Decisions are typically made in isolation, independent from any previous or subsequent choices. This approach neglects the complexity of everyday decision-making, which often involves multiple interdependent choices and several uncertain events. We present recent work that extends the traditional risky decision making paradigm by incorporating some of the complexities of real world choices. Participants completed a series of multistage decision trials, represented as branching decision trees. At decision nodes, participants chose which path to take through the tree. At chance nodes, a random event determined the path. Crucially, participants had the option to use some of the points earned on previous trials to reduce their uncertainty by purchasing information about chance nodes. We review data showing how individuals incorporate factors like risk, information search cost, and degree of uncertainty when forming plans for multistage decision scenarios. Our results show individual differences, with several distinct strategies emerging. A comparison of multiple competing models is used to elucidate the cognitive processes at work.

Speaker's Name:	David Huber
First Author's Name:	Cory Rieth

First Author's Affiliation: University of California, San Diego

Second Author's Name: David Huber

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Title: Transitions from positive to negative short-term word priming: Familiarity, directionality, and expectation

Abstract: Short-term repetition priming in a perceptual word identification task typically produces a transition from positive to negative priming as a function of increasing prime duration. We tested the determinants of this phenomenon by manipulating familiarity, directionality and expectation. Familiarity was manipulated by comparing repetition priming of words versus repetition priming of non-words. Non-words were slower to produce a transition towards negative priming. Directionality was manipulated by comparing forward-only versus backward-only associatively related primes. Forward-only associations were slower to produce a transition towards negative priming even though forward-only associations produced larger priming effects. Expectation was manipulated by comparing repetition priming that might be expected based on common usage (e.g. ♠walk the walk♠) versus unexpected repetitions and expected non-repetitions. Expected non-repetitions were nearly identical to the results from forward-only associative priming. Furthermore, this pattern was also nearly identical to the difference between priming with expected repetitions and unexpected repetitions. Simulations with a dynamic neural network were used to explore potential correlates of these manipulations: Familiarity was explained by varying bottom-up connection strength whereas directionality and expectations were explained by varying top-down connection strength.

J

Speaker's Name: Mirjam Jenny

First Author's Name: Mirjam Jenny

First Author's Affiliation: University of Basel

Second Author's Name: Jörg Rieskamp

Second Author's Affiliation: University of Basel

Third Author's Name: Håkan Nilsson

Third Author's Affiliation: Uppsala University

Title: The queen of hearts and the ace of spades: Describing conjunctive probability assessment from experience with weighted averaging

Abstract: How likely is it that both my flight will be punctual and that the people at the printing center will have my poster ready in time? Probability theory prescribes such conjoint (conjunctive) probabilities to be assessed by multiplying the independent constituent probabilities. In their everyday lives, people often have to assess conjoint probabilities based on approximate, error-prone knowledge of the experienced constituent probabilities. Simulations have shown that under such conditions a weighted average of the constituent probabilities leads to better probability judgments than the multiplicative rule (Juslin, Nilsson, & Winman, 2009, *Psychological Review*, 116). Weighted averaging predicts (a) a higher overestimation effect for conjunctive than constituent probability assessments and (b) conjunction effects?

conjunctive probabilities exceeding the larger of two constituent probabilities. We empirically test the weighted average model against the multiplication model (including a Bayesian version thereof) and other alternative models using a card game paradigm. The results illustrate the superiority of the weighted average model in predicting people's choices that are based on assessed conjunctive probabilities. In our first study we found higher overestimations of conjunctive than constituent probabilities as well as conjunction effects. In our second study we modeled participants' decisions from experience about conjunctive events and found that weighted averaging explained the results better than the multiplication rule prescribed by probability theory and the Bayesian version thereof.

Speaker's Name:	Matt Jones
First Author's Name:	Keith Lohse
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Second Author's Name:	Matt Jones
Second Author's Affiliation:	University of Colorado
Third Author's Name:	Alice Healy
Third Author's Affiliation:	N/A
Fourth Author's Name:	David Sherwood
Fourth Author's Affiliation:	N/A
Title:	The Role of Attention in Motor Control
Abstract:	Recent work on complex motor performance has found a performance advantage for subjects instructed to attend externally, to the task outcome, versus internally, to the bodily components of the movement. Paradoxically, external attention also produces increased variability of the movement across trials, as measured for example by angles of individual joints. We propose a theory of attention in motor control that resolves this puzzle, and that aims to explain the broader effects of internal versus external attention on motor performance. Our proposal integrates ideas from optimal control theory and cognitive models of selective attention in learning and perception, which lead to the prediction that attention acts to selectively reduce variability along attended dimensions of movement. Shifting from an internal to an external focus of attention should thus increase variability of individual bodily dimensions (e.g., joint angles) but at the same time decrease variability in movement outcomes by increasing the intercorrelations among bodily dimensions. This prediction was supported in a dart-throwing experiment using detailed video recording of subjects' arm motions, with subjects instructed to attend to various aspects of the task (arm motion, release point, dart trajectory, or target location).

K

Speaker's Name:	Shaw Ketels
First Author's Name:	Shaw Ketels
First Author's Affiliation:	University of Colorado at Boulder
Second Author's Name:	Keith Lohse
Second Author's Affiliation:	University of Colorado at Boulder
Third Author's Name:	Alice Healy
Third Author's Affiliation:	University of Colorado at Boulder

Title: Attentional focus and the learning of a complex motor task: The case of snowboarding

Abstract: Experimental research on instructional design has shown that performance (in the short-term) and learning (in the long-term) depend critically on the nature of the instructions being given. An excellent example of this is how verbal instructions direct a learner's attention to different aspects of the task (see Wulf, 2007, for a review). Instructions encouraging learners to focus on the effects of their actions improves performance and learning in a number of ways: increased accuracy, more efficient muscular recruitment, and decreased preparation time (Lohse, Sherwood, & Healy, 2010). Conversely, verbal instructions encouraging learners to focus on the movements of their actions have the reverse effects and generally worsen performance and learning. Although these effects have been demonstrated in a number of laboratory tasks (Maddox et al., 1999.; Shea & Wulf, 1999; Wulf, Shea, & Park, 2001, Wulf, Heuer, Prinz, 1998; Wulf, Lauterbach, & Toole, 1999) there has been little to no research on the practical significance of these effects outside of the laboratory in naturalistic settings. Here we present results of a naturalistic investigation focusing on the instruction of novice snowboarders.

L

Speaker's Name: Stephan Lewandowsky

First Author's Name: Stephan Lewandowsky

First Author's Affiliation: University of Western Australia and University of Zurich

Second Author's Name: Klaus Oberauer

Second Author's Affiliation: University of Zurich and University of Western Australia

Title: SOB-CS: An interference model of complex span

Abstract: We will present an extension of the SOB model of serial recall to the complex-span paradigm, a popular paradigm for investigating working memory. The model builds on the following assumptions: Representations of items, their serial positions, and of material involved in concurrent processing tasks (distractors) are distributed. Items are encoded by associating them to their positions. Forgetting arises from interference by superposition of several association patterns in the same weight matrix. Distractors are obligatorily encoded into working memory, thereby adding interference. Free time following a distractor enables gradual removal of that distractor from memory. The model explains benchmark findings from complex span: The decrease of memory performance with cognitive load, the effect of number of distractor operations and its modulation by distractor similarity, the serial position curve, error patterns, and individual differences in simple and complex span tasks.

Speaker's Name: Bradley Love

First Author's Name: Bradley Love

First Author's Affiliation: Texas

Title: Forecasting and Classification Using Absolute and Rate Information

Abstract: When a stock falls 50 points one day and rebounds 50 points the next day the resulting value is unchanged from the initial value. In contrast, When a stock falls 50% one day and rebounds 50% the next day the resulting value is only 75% of

the initial value. The first case involves absolute quantities, therefore the arithmetic mean should be used; whereas second case involves rate information and therefore the geometric mean is appropriate. When classifying observed returns as involving an overall increase or decrease in value, participants relied on the arithmetic mean, even when it was inappropriate to do so. A similar pattern was found in forecasting the next return after observing a sequence of previous returns. Irrespective of whether information was presented in absolute or rate formats, participants linearly extrapolated from previous results using arithmetic operations. In other words, forecasting was most accurate for linear functions when information was presented in absolute terms and for exponential functions when information was presented in a rate format.

M

Speaker's Name: Bennet Murdock
First Author's Name: Bennet Murdock
First Author's Affiliation: University of Toronto
Title: Trial and Error Learning
Abstract: Trial and error learning was quite popular 50 years ago (McGeoch 1940 had about 40 references) but later books on memory and learning (Osgood, Wickelgren, Murdock, Crowder, Greene, Haberlandt, Neath & Suprenant, Kahana in press) have none. Focus instead is on recognition, paired associates, and free recall. Stimulated by Herb Terrace's work with rhesus monkeys showing evidence for position coding I have tried to incorporate this into the TODAM framework and I will present simulations of several different models (TODAM, a connectionist model, REM, a non-associative "string" model based only on conjoint item information, and maybe one or two more and will compare their performance on a several different measures.

N

Speaker's Name: Louis Narens
First Author's Name: Louis Narens
First Author's Affiliation: Cognitive Sciences, UC Irvine
Title: Putting Steven's Methods of Magnitude Estimation and Production on a Rigorous Measurement Theoretic Foundation.
Abstract: In 1946, S. S. Stevens presented new methods for measuring psychological phenomena called \diamond magnitude estimation \diamond and \diamond magnitude production \diamond that were radical departures from established measurement methods, particularly those from the physical sciences. For measurement specialists outside of psychology--and from many within psychology \diamond Stevens \diamond methods were considered to be non-rigorous and unsound. This talk describes a new, rigorous approach to magnitude estimation and production based on modern measurement theory. The bottom line is that the assumptions behind Stevens' methods, while internally consistent, are dramatically inconsistent with data--if the correct kind of data is collected. Nevertheless, magnitude estimation and production data can be modeled by ratio scales, but not in the manner described by Stevens' methods.

This is illustrated by recent theory and experiments by Luce, Steingrímsson, & Narens (e.g., *Psychological Review*, 2010, volume 117, 1247-1258).

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Fifth Author's Name:	Jonathan Nelson
Fifth Author's Affiliation:	Max Planck Institute for Human Development, Berlin, Germany
Title:	Optimality, heuristics, and children's sequential information search
Abstract:	<p>Consider a game of guessing which person has been chosen at random from among several people. The task is to identify the person with the smallest number of yes-or-no questions, about specific features that some people have (e.g. "Is the person wearing earrings?"). It is impractical or impossible to check which of all possible sequences of questions is most efficient. Are any heuristic or stepwise-optimal strategies effective? Does it depend on what environment the people are from? We addressed this in a Representative Environment with similar numbers of male and female people, and in a predominantly male Nonrepresentative Environment. Exhaustive search revealed that in the Nonrepresentative Environment, beard is the best first question. In the Representative Environment, gender is the best first question. Remarkably, a simple heuristic strategy-- asking about the feature possessed by closest to half of the possible individuals-- identifies the optimal sequence of questions in both environments. We conducted an experiment to explore 4th-grade children's strategies in this game, using cards with cartoon faces to represent the possible people. The children adapted their searches to each environment and preferentially asked the best first question in each environment. In the Nonrepresentative Environment, the best first question (beard) initially tied with gender for most popular. In the Representative Environment, a strong majority of children asked the most useful question (gender) first. This could suggest that people's searches are especially efficient in real-world environments. The quality of questions increased after multiple rounds of the game were played, in both environments.</p>

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Third Author's Name: Simon Van Gaal

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Title: Subliminal Processing in Long-term Memory

Abstract: In SAM-REM theory long-term priming effects are assumed to be due to the storage of new traces or features in memory, therefore presumably being dependent on the contribution of attention. When introducing the semantic-episodic distinction of long-term memory however it is not entirely clear how priming would be affected by variations in the attentional mechanism. In a first series of experiments we looked at how conscious vs un-conscious processing of information would affect long-term priming. Results suggest that even in the case of subliminal (un-conscious) processing, a form of long-term priming emerges. Crucially, the form of priming differs between conscious and un-conscious conditions. In a second series of experiments we looked more closely at how the content of information (i.e. feature type) differs between conscious and un-conscious processing. We hypothesize a predominance of perceptual information for the unconscious condition whereas a joint contribution of item and contextual information for the conscious condition.

O

Speaker's Name: Klaus Oberauer

First Author's Name: Klaus Oberauer

First Author's Affiliation: University of Zurich

Second Author's Name: Stephan Lewandowsky

Second Author's Affiliation: University of Western Australia

Title: Evidence against decay in verbal working memory

Abstract: Two experiments with a complex-span task tested whether forgetting in working memory is caused by time-based decay. Encoding of letter lists for serial recall alternated with processing periods comprising four trials of difficult visual search. Search time, during which memory could decay, was manipulated via search set size. Free time between search trials, during which memory could be restored, was also manipulated. Despite nearly doubling the retention interval, the manipulation of search time failed to affect memory. This result held with and without articulatory suppression. Two further experiments with a PRP paradigm confirmed that the visual search task required central attention. Thus, even when maintenance by central attention and by sub-vocal articulation was prevented, a large delay had no effect on memory, contrary to the notion of decay.

P

Speaker's Name: Giovanni Pezzulo

First Author's Name: Giovanni Pezzulo

First Author's Affiliation: National Research Council of Italy

Second Author's Name: Haris Dindo

Second Author's Affiliation: Computer Science Engineering, University of Palermo

Third Author's Name: Laura Barca

Third Author's Affiliation: National Research Council of Italy

Title: Action understanding through the reuse of one's own skills: a computational model

Abstract: It has been proposed that humans (and some non-human animals) can reuse their motor skill repertoire to facilitate perceptual processing and understanding of actions executed by others. Evidence for this view comes from a variety of studies, showing that observed actions are encoded into the observer's motor apparatus, that performed and observed actions interfere when they are incongruent, and that eye motor programs used in action performance can be reused in action observation. However, several aspects of this process remain elusive, and this has led to a proliferation of theories that emphasize a 'direct matching' of observed and performed goals, associative processes based on perceived context, predictive processing, and inverse inference, respectively. Furthermore, implementations of these theories are in most cases computationally inefficient or intractable. We describe a generative Bayesian model for action understanding, in which inverse-forward internal model pairs, normally used in motor control, are also used for guiding action observation. In brief, an approximate inference mechanism uses internal models to generate hypotheses of plausible action goals and to explore them in parallel. We highlight three aspects of this model. First, we discuss how it partially reconciles different views of action understanding by pointing to a synergic contribution of predictive processes and context information. Second, we present experimental results that test its robustness and efficiency in real-world scenarios. Third, we present the predictions of our model relative to a particularly interesting implication of the 'motor skills reuse' hypothesis: subjects with augmented motor abilities, (e.g., athletes such as dancers, climbers or soccer players, but also expert musicians) should be facilitated in their perceptual processing and error monitoring, if the observed action belongs to their domain of expertise.

R

Speaker's Name: Michael Ramscar

First Author's Name: Michael Ramscar

First Author's Affiliation: Stanford University

Second Author's Name: Richard Futrell

Second Author's Affiliation: Stanford University

Third Author's Name: Melody Dye

Third Author's Affiliation: Indiana University, Bloomington

Title: The Evolution Of Noun Classification In Two Germanic Languages

Abstract: For generations, linguists, philosophers and psychologists have accepted the idea that grammatical gender serves no functional purpose, even though it has co-evolved across many different languages. We question this 'purposeless' assumption by considering the case of the German gender system and examining whether gendered determiners might play an informative role in language processing. An information theoretic analysis of German reveals that the gender system serves to make nouns more predictable in context. Moreover, like other subsystems of language - such

as verb inflection - the gender system is more specifically informative about high frequency items than low frequency items. To further assess the functional role that gender plays, we then compare German to modern English, a Germanic language that has largely shed its gender system. We find that grammatical gender allows German speakers to use a wider variety of nouns after articles. However, it appears that English has systematically compensated for its diminished gender system by extending the use of pronominal adjectives, employing them with greater frequency as the frequency of the nouns they precede decreases. We show that not only do English pronominal adjectives help to make nouns more predictable in context, but that the distribution of pronominal adjectives is organized to optimize this function by ensuring that pronominal adjectives provide more support for low frequency nouns than high frequency nouns, thereby helping to make all nouns equally predictable in context. We consider the implications of these findings for our wider understanding of language and communication.

Speaker's Name: William Ramsey
First Author's Name: William Ramsey
First Author's Affiliation: University of Nevada, Las Vegas
Title: Properly Understanding Dynamicism in Cognitive Science
Abstract: One area where philosophers can help cognitive scientists is by providing answers to epistemological questions about the proper way to understand different large-scale theoretical frameworks. In this talk, I will try to do this with regard to Dynamic Systems Theory in cognitive science. The traditional outlook has been that Dynamicism is an alternative explanatory model that competes with other explanatory frameworks, like Classical Computationalism or Connectionism. It is claimed to offer its own sort of explanatory posits and principles. My claim will be that this outlook is mistaken. Dynamicism, properly understood, is not an explanatory theory of cognition, and is not in competition with other explanatory models or frameworks. It instead provides an abstract descriptive framework that offers a mathematical interpretation of a complex system's behavior over time. Though not explanatory, this descriptive role is nevertheless an important one that has considerable predictive power and can provide a number of important insights about cognitive activity.

Speaker's Name: roger ratcliff
First Author's Name: roger ratcliff
First Author's Affiliation: ohio state
Second Author's Name: gail mckoon
Second Author's Affiliation: ohio state
Title: Speed of Processing and Individual Differences
Abstract: In the neuropsychological literature, speed of processing measures are rampant. They are widely used to assess deficits and impairments. However, in a recent book (2008), "Information processing speed in clinical populations," there is absolutely no mention of any of the theories that cognitive psychologists have developed about processing speed over the last 40 or 50 years. We will present diffusion model

analyses of simple two-choice experiments (numerosity discrimination, lexical decision, and recognition memory) that show ranges of individual differences and practice effects over eight sessions of training with college-age and 60-90 year-old subjects. From these analyses, we will discuss issues in applying theory from cognitive psychology to neuropsychological and clinical testing.

Speaker's Name: Lynne Reder
First Author's Name: Lynne Reder
First Author's Affiliation: Baker Hall 345-F CMU, Pittsburgh PA 15213
Title: Familiarity of elements affects knowledge formation
Abstract: In this talk I will present a new theory and new evidence that suggests a critical, overlooked aspect of the contingencies that affects our ability to form new memory structures. I will first briefly describe some of the results that motivated the hypothesis (e.g., that low frequency words are better recognized than high frequency words but both low and high frequency words are less well recognized when other elements in the list are low frequency) and then briefly describe three different experiments that support this theory.

S

Speaker's Name: Adam Sanborn
First Author's Name: Adam Sanborn
First Author's Affiliation: University of Warwick
Second Author's Name: Vikash Mansinghka
Second Author's Affiliation: University of Massachusetts
Third Author's Name: Thomas Griffiths
Third Author's Affiliation: University of California, Berkeley
Title: A rational model of intuitive dynamics
Abstract: People have strong intuitions about the masses of objects and the causal forces that they exert upon one another when they collide. These intuitions appear to not match the predictions of Newtonian physics, as the accuracy of human judgments is influenced by irrelevant variables, such as whether kinetic energy is conserved. In addition, there is a robust bias towards believing that the heavier object is the one that was initially moving faster. These findings have led researchers to conclude that people use heuristics to make judgments about collisions. We demonstrate that Newtonian physics is sufficient to explain people's collision judgments, if combined with uncertainty about the velocities of the objects. Unlike heuristics, physical theory with noise can make predictions for other tasks.

Speaker's Name: Richard Shiffrin
First Author's Name: Richard Shiffrin
First Author's Affiliation: Indiana University
Second Author's Name: Greg Cox
Second Author's Affiliation: Indiana University
Title: A dynamic activation model for accuracy and response time in recognition memory.
Abstract: Supposing episodic events (say on a list) consist of single instances of radically differing stimulus types (e.g.

snowflakes, tunes, words, gabor patches, toasters, faces) how are decision criteria chosen for subsequent recognition memory that are appropriate for the different stimulus classes? A standard approach to recognition memory decisions is rooted in signal detection: The test item is compared to the traces in episodic memory, producing a noisy \diamond familiarity \diamond signal. Familiarity for targets and foils are presumed to be sampled from different distributions, and a decision criterion is chosen somewhere between the two distributions. For single classes of stimuli, a criterion can be learned, and for slightly different classes (e.g. high and low frequency words) models have been developed to predict observed mirror effects. It is, however, a mystery how appropriate criteria can be chosen for different stimulus classes when these are likely to differ from each other by large amounts, and there is no opportunity to learn them. We therefore propose a model in which the decision is based on the dynamic profile of activation or familiarity: In our modification of the standard REM model, familiarity (defined as \diamond odds \diamond in REM) tends to rise for targets and fall for foils as features of the test stimulus are extracted. This is generally true regardless of such factors as asymptotic level of familiarity, number of extra list traces in memory, strength of storage, list length, and number of prior tests. Our new model therefore monitors moment to moment changes in odds, adding positive changes to one accumulator (leading to an "old" response) and negative changes to another accumulator (leading to a "new" response), with the decision amounting to the outcome of a race between the two accumulators. Simulation results show that the model provides a reasonable basis for decisions that is robust to differences in stimulus class and the experimental variables used in recognition memory studies.

Speaker's Name:

Vladimir Sloutsky

First Author's Name:

Vladimir Sloutsky

First Author's Affiliation:

Ohio State University

Title:

Selective Attention and Categorization: What develops?

Abstract:

It has been often argued that even early in development people generalize by focusing on deep conceptual properties rather than on surface similarities. However, such \diamond smart \diamond generalization would require the ability to focus on non-observable properties while ignoring salient yet distracting information. In this work we examine the development of the ability to selectively focus on relevant information and to ignore distracting irrelevant information. In a series of experiments, we presented 3-year-olds, 4-year-olds, and adults with variants of a match-to-sample task, where they had to focus on non-salient targets, while ignoring salient distractors. In all experiments children exhibited difficulty ignoring the distractors (measured by filtering costs). The eye tracking analyses indicated that the costs stemmed from inefficient oculomotor control, resulting in the inability to ignore distractors. The inability persisted even after extensive training, which suggests that the difficulty may stem from critical immaturities of the executive system.

Speaker's Name:

George Sperling

First Author's Name: George Sperling
First Author's Affiliation: University of California, Irvine
Second Author's Name: Ian Scofield
Second Author's Affiliation: University of California, Irvine
Third Author's Name: Arvin Hsu
Third Author's Affiliation: University of California, Irvine
Title: Measuring both the Spatial Resolution and the Cognitive Capacity of Visual Selective Attention
Abstract: The spatial resolution of visual functions typically is measured by presenting sinewave stimuli of different spatial frequencies and determining the ability of observers to perform a visual function (such as discriminating the presence or the orientation of a grating) as a function of spatial frequency. The spatial resolution of attention is similarly measured by requiring observers to attend to alternate strips of a stimulus (squarewave) in which a target to be detected is presented, for example, in one of the even strips while false targets (foils) which must be ignored are presented in the odd strips (Gobell, Tseng, and Sperling, Vision Research, 2004). As the spatial frequency (and thereby the number of to-be-attended regions) of the requested squarewave distribution of attention increase, performance declines. Based on the spatial resolution of attention measured in 12x12 arrays containing 1 target in a to-be-attended region, 10 false targets in the to-be-ignored regions, and 133 distractors, predictions can be made for observers' abilities to distribute attention in arbitrarily complex spatial regions. These predictions are quite accurate until the requested pattern of attentional distribution becomes too complex, at which point a cognitive limit becomes apparent. For different observers and for complex required distributions of attention, the observed performances can be described in terms of the individual spatial resolution limits and the cognitive limits of visual attention.

Speaker's Name: Jochen J. Steil
First Author's Name: Jochen J. Steil
First Author's Affiliation: Institute for Cognition and Robotics, Bielefeld University
Title: Where to Look Next? Proto-objects in a TVA-based Computational Model of Visual Attention
Abstract: To decide "Where to look next?" is a central function of the attention system of humans, animals and robots. Control of attention depends on three factors, that is, low-level static and dynamic visual features of the environment (bottom-up), medium-level visual features of proto-objects and the task (top-down). We present a novel integrated computational model that includes all these factors in a coherent architecture based on findings and constraints from the primate visual system. The model combines spatially inhomogeneous processing of static features, spatio-temporal motion features and task-dependent priority control in the form of the first computational implementation of saliency computation as specified by the "Theory of Visual Attention" (TVA, \cite{bundesen90}). Importantly, static and dynamic processing streams are fused at the level of visual proto-objects, that is, ellipsoidal visual units that have the additional medium-level features of position, size, shape and

orientation of the principal axis. Proto-objects serve as input to the TVA process that combines top-down and bottom-up information for computing attentional priorities so that relatively complex search tasks can be implemented. To this end, separately computed static and dynamic proto-objects are filtered and subsequently merged into one combined map of proto-objects. For each proto-object, attentional priorities in the form of attentional weights are computed according to TVA. The target of the next saccade is the center of gravity of the proto-object with the highest weight according to the task. We illustrate the approach by applying it to several real world image sequences and show that it is robust to parameter variations.

U

Speaker's Name: Nachum Ulanovsky
First Author's Name: Nachum Ulanovsky
First Author's Affiliation: Department of Neurobiology, Weizmann Institute of Science
Title: Neural codes for space in the hippocampus and entorhinal cortex of bats
Abstract: The work in our lab focuses on understanding the neural basis of behavior in freely-moving, freely behaving mammals - employing the echolocating bat as a novel model system. My talk will describe our recent findings of 'place cells' in the hippocampus of bats, as well as 'grid cells' in the entorhinal cortex - which were present in the absence of theta oscillation - a finding that puts strong constraints on theories of grid formation in mammalian entorhinal cortex. I will also present preliminary results on recording hippocampal neural activity in freely-flying bats, using a custom neural telemetry system. I will also describe our recent studies of spatial memory and navigation of fruit bats in the wild, using micro-GPS devices, which suggested the first evidence for a large scale (100-km size) 'cognitive map' in a mammal. Finally, I will talk about a recent optimization principle that we found in how bats acquire sensory information from their environment.

Speaker's Name: Shimon Ullman
First Author's Name: Shimon Ullman
First Author's Affiliation: Weizmann Institute
Title: Detecting hands: combining learning with innate concepts
Abstract: In learning to understand actions and goals, an important part is identifying the agents' hands and what they are doing. In computational schemes, the recognition of body parts in general and hands in particular is notoriously difficult. In contrast, detecting hands, paying attention to what they are doing, and using them to make inferences and predictions, are natural for humans and appear early in development. I will describe an approach motivated by perceptual development, which can acquire hands representation and develop efficient detection and recognition processes. Unlike unguided statistical-based learning, the scheme is biased from the start by simple proto-concepts of hands, which guide the learning process along a path that gradually leads it to acquire useful hand representations and sophisticated detection processes.

W

Speaker's Name: Eric-Jan Wagenmakers
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Second Author's Name: Conor Dolan
Second Author's Affiliation: University of Amsterdam
Third Author's Name: Gilles Dutilh
Third Author's Affiliation: University of Amsterdam
Fourth Author's Name: Ruud Wetzels
Fourth Author's Affiliation: University of Amsterdam
Fifth Author's Name: Sophie van der Sluis
Fifth Author's Affiliation: Free University of Amsterdam
Sixth Author's Name: Eric-Jan Wagenmakers
Sixth Author's Affiliation: University of Amsterdam
Title: A Bayesian Test for the Hot Hand Phenomenon
Abstract: In many sports it may appear that performance is streaky, as players can alternate runs of good performance with runs of poor performance. The fact that a player can be either in a hot state (i.e., perform well) or in a cold state (i.e., perform poorly) is known as the hot hand phenomenon. Here we propose a Bayesian test to quantify the statistical evidence for and against the hot hand phenomenon. Specifically, we used the Bayes factor to compare a three-parameter two-state Bernoulli Hidden Markov Model (HMM) to a baseline model that assumes constant performance. The HMM has two parameters that represent the probability of a hit in each state and a third parameter that represents the probability of staying in a state. The advantage of using an HMM in the context of the hot hand phenomenon (as opposed to commonly used statistics such as the length of the longest run of successes) is that the HMM structurally corresponds to the definition of a streaky player. The advantage of using the Bayes factor is that it naturally accounts for differences in model flexibility. Performance of the new test is explored in simulation studies and real data examples involving baseball, basketball, and experimental psychology.

Speaker's Name: Christoph Weidemann
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Title: Beyond confidence ratings: How can cognitive states be assessed?
Abstract: A (sometimes implicit) assumption in almost all models of cognitive processes is that memories, percepts and other cognitive states vary in strength. Yet accuracy in psychological task usually cannot distinguish between more than two levels of a cognitive state (e.g., perceived vs. not perceived or remembered vs. not remembered) on any given trial. A common attempt to measure strength of cognitive states is to ask participants to rate their confidence in their response on each trial. We investigate the question to what extent information contained in such confidence ratings might already be present in other dependent variables that

are incidental to the task. Using the example of response times in a recognition memory experiment, we will present novel measures based on receiver operating characteristic functions that quantify to what extent a dependent variable (confidence ratings, response times, brain activity, etc.) contains information about the strength of cognitive states.

Speaker's Name:	Michal Wierzchon
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Title:	Comparing measures of consciousness in an artificial grammar learning task
Abstract:	Consciousness can be measured in different ways, and different measures unfortunately often yield different conclusions about the extent to which awareness relates to performance. The challenge of correctly identifying which measure is best is thus substantial. Here, we compare five different subjective measures of rule awareness in the context of an artificial grammar learning task. Participants (N = 217) were first asked to memorize letter strings generated based on an artificial grammar and were then to classify new strings as grammatical or not. On each decision, they also had to express their awareness of the rules by means of one of five different scales: (1) confidence rating (CR), (2) post-decision wagering (PDW), (3) rule awareness (RAS, a modified version of the perceptual awareness scale), (4) the Sergent-Dehaene continuous scale (SDS), and (5) feeling of warmth (FOW, a new measure). All scales were found equally sensitive to conscious knowledge, but PDW and SDS are affected by risk aversion. We observed that CR captures the largest range of states of consciousness (yielding the largest difference in accuracy between the highest and lowest scale points), but also that only CR fails to indicate unconscious knowledge by means of the guessing criterion (chance performance when guessing). Scale comparison analyses suggest that CR, RAS, and our new scale FOW should be preferred to SDS and PDW. CR's unique features suggest that it may be used in conjunction with RAS or FOW to enable finer assessment of subjective states of awareness.

Z

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Title: The Effect of Study Time Distribution on Learning and Retention: A Goldilocks Principle for Presentation Rate

Abstract: Two experiments investigated the effect of presentation rate on both immediate (5 min) and delayed (2 days) cued recall of paired associates. Word pairs were presented for a total of 16 s per pair with presentation duration of individual presentations varying from 1 to 16 s. In Experiment 1 participants studied word pairs with presentation rates of 16 x 1 s, 8 x 2 s, 4 x 4 s, 2 x 8 s, or 1 x 16 s. A non-monotonic relationship was found between presentation rate and cued recall performance. Both short (e.g., 1 s) and long (e.g., 16 s) presentation durations resulted in poor immediate and delayed recall compared to intermediate presentation durations. In Experiment 2 we replicated these general findings. Moreover, we showed that the 4 s condition resulted in a lower rate of proportional forgetting than the 1 s and the 16 s conditions.

Speaker's Name: Johannes Ziegler

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Second Author's Name: Jonathan Grainger

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Third Author's Name: Johannes Ziegler

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Title: How to Say No to a Nonword: Further Explorations of the Lexical Decision Task

Abstract: We use the Leaky Competing Accumulator (LCA) model of speeded binary decision making as a tool for understanding the mechanisms involved in responding to nonword stimuli in the lexical decision task. We compare two versions of an LCA model of lexical decision: A standard LCA binary decision model (LCA-s), and a version that implements a dynamic deadline (LCA-t). The LCA-t model uses evidence for the presence of a word as input to the YES decision, and time from stimulus onset as input to the NO decision. Evidence for a nonword is therefore a function of time from stimulus onset modulated by lexical activity via the competitive dynamics of LCA (i.e., inhibition between decision nodes). This model failed to capture some key patterns in the data, and in particular produced RTs to nonword stimuli that were too slow relative to word RTs. The LCA-s model provided superior fits to the data. The success of the standard model is due to the additional constraint that total input to the two decision nodes must be a constant, such that evidence for a nonword is a constant value minus evidence for a word.

Speaker's Name: Marco Zorzi

First Author's Name: Marco Zorzi

First Author's Affiliation: University of Padova

Second Author's Name: Ivilin Stoianov

Second Author's Affiliation: University of Padova

Title: Emergence of a Visual Number Sense in Hierarchical Generative Models

Abstract:

Many animal species have evolved a capacity to estimate the numerosity of visual objects. Though foundational to mathematical learning in humans, the nature of the computations underlying this visual sense of number remains controversial. Here we show that visual numerosity emerges as a statistical property of images in deep networks that learn a hierarchical generative model of the sensory input. Emergent numerosity detectors in the network's deepest layer had response profiles resembling that of monkey parietal neurons and their activity supported a numerosity estimation task with the same behavioral signature and performance level shown by humans and animals.

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