CAF: This is November 14 [2014]. Carol Fowler and Donald Shankweiler present.

We're going to do an oral history of Donald. So shall we just start with the first question about your educational background?
DPS: Sure, you're the boss.
CAF: OK. Take it away.
DPS: OK. Well, You didn't ask where I went to college, but I went to Oberlin College and I think that…., majored in Psychology there. And I didn't have any idea that I was going to do that when I arrived as a freshman. In fact, I thought I was probably going to major in Chemistry. But some practical experiences in Chemistry convinced me that that wasn.t my destiny. And I decided I think to major in Psychology during my first psychology course, which was taught by George Heise, who was a…had been a student at Harvard. And he had worked with Skinner and George Miller, and Stevens so that he had a background that was, in some way, rather parallel to Kathy Harris'. I really didn't think about that until some time later.
CAF: Would they have been contemporary?
DPS: Um, no. Well, I have to think about that. I don't think so. I'm not sure.
CAF: He would have been older? [Obit: Heise, born in 1924; Harris got her BA in 1943, so close to contemporary; Heise obit: http://webapp1.dlib.indiana.edu/bfc/view?docId=B07-1996&chunk.id=d1e97&toc.id=&brand=bfc]
DPS: I'm not sure when he got his PhD. He hadn't been at Oberlin very long. He was probably a little earlier, because I took the course in 1954, his course, yeah
CAF: Yeah, he would have been…
DPS: He was a behaviorist, but he was an interesting person who was interested in a lot of things. And, he wasn't a guy who just worked in a paradigm and didn't look to the right or to the left. He was interested in speech in some ways in the sense that George Miller was interested in it. He had studied…He had published with Miller on the effects of noise on intelligibility and discovering the sort of interesting tradeoff between redundancy and noise in intelligibility.
CAF: Oh, nice.
DPS: He was also bitten more than Kathy was by Skinner. I think he…And he eventually left teaching and went into psychopharmacology, and tested…spent the rest of his life testing the behavioral effects of psychoactive drugs.
CAF: Oh! On rats?
DPS: Yeah and probably…and other things So he went back to animal psychology. But at Harvard, he'd had a good dose of other things, and in his course, he taught a lot of other things. Why did…
CAF: So that's how you became a psychologist., because you took a course from him.
DPS: I took a course from him. And there were a couple of other people at Oberlin that…there was a very magnetic teacher, Cole, Lawrence Cole, who was, I guess, more interested in personality than anything else. But he was an absolutely magnetic teacher. And taught in a Socratic fashion. So he would sell you completely

on a theory point of view and then demolish it just at the time that you'd become feeling like this was the key!
CAF: Right. That's how I became a Gibsonian. Turvey did exactly that with Ulric Neisser's book on constructionism. He just presented it very convincingly then put us onto Gibson and started tearing down constructivism. We couldn't believe it.
DPS: The interesting thing about that is that Neisser himself ort of embraced Gibson stuff later.
CAF: Yes, yes he did.
DPS: This is ahead of the story though.
CAF: Yeah.
DPS: And I didn't know anything about Stetson's work.
CAF: Right!
DPS: He died I think just before I arrived as a freshman in '52. [Raymond Stetson, died 1950] But some of the apparatus was hanging around. And it was…and one of his younger colleagues, a man called Homer Weaver, was there, and.. But Weaver was not somebody who would lead you to appreciate Stetson, because he was one of the most boring teachers imaginable. I had my first course in experimental psychology with him and it's a wonder that…I ever went anywhere. But he probably did some interesting work. He didn't tell us about ….He was interested in music perception during performance. And he had a camera that he had built, maybe with Stetson. I don't know that fit over the keyboard and could photograph the eyes as somebody was performing music.
CAF: Wow that was ahead of his time wasn't it?
DPS: But he didn't tell us about this in the course. And you sort of had to sort of… if you tried to talk him about it he would tell you something about it that was kind of interesting.
CAF: Bruno [Repp] would have been interested in him.
DPS: Yeah. And why did I go to University of Iowa for graduate work? Well, partly because a student from Oberlin, Arthur Benton, who had done both a bachelors and masters there. They had a small masters program that was rather good, I think. George [Probably, Robert, not George] Galambos was a graduate of that, Roger Sperry was a graduate….was a masters….
CAF: Now wait, are you talking about Benton having gone to Oberlin?
DPS: Yeah.
CAF: He did!
DPS: He did.
CAF: And Sperry also?
DPS: And Sperry also. And Galambos. Those were three psychologists who had…
CAF: And so Benton got a faculty position at Iowa.
DPS: Yeah. And Benton became interested in the effects of brain injury on perception, memory and things, because he had had… during the war, he was assigned to Morris Bender, who was a neurologist who was especially interested in vision. And who ran a brain injury diagnosis and rehabilitation program in the San Diego Naval Hospital.
CAF: OK

DPS: So Benton got interested in perceptual deficits from brain lesions and he was interested also in functions of the frontal lobes and personality and other things. He had broad interests. But he created a sort of pioneer program in neuropsychology at the University of Iowa, and I was in that. It was kind of schizophrenic being there, because Iowa was a hotbed of Hullian psychology and Spence was the most influential person in the…on the faculty. He was head of the department, and all of the students had to take his course. I found him a pretty interesting teacher although extremely narrow in the sense that he believed that the only way that psychology could make progress was to do mini experiments.
CAF: incremental work?
DPS: Right. That kind of thing….that kind of idea.
CAF: So when were you in grad school? What would be the years?
DPS: I came in '56, and I got my PhD in '60.
CAF: OK. Wow. You were efficient.
DPS: Well, it was sort of…It was up or out in that period. It was an interesting period. Some people finished in 3 years. But I think 4 was about average. And they did! There was a lot of people wanting to go into graduate school. It was a very different time. And the GI Bill made it possible for veterans to go who…people who wouldn't otherwise have been able to. So there was…If they threw people out, they knew there were people hammering at the gates to get in. So they..
CAF: I see. So they could be pretty tough.
DPS: They were pretty tough. They threw out sometimes close to half of their entering class each year. So it made for a kind of anxious…
CAF: Right!!
DPS: period of graduate study. After…Once you got past these initiation rites, it was pretty nice. Pretty nice place, but…
10:07
CAF: Did you work with brain-injured populations with Benton?
DPS: Yes, yes. Both at the VA hospital and the University hospital. And University of Iowa had a rather distinguished neurology group, people who were very scholarly and interested in higher function, which was unusual for neurologists?
CAF: So not just perceptual systems?
DPS: So Benton had colleagues. In fact, Benton became, while I was there, Professor of Neurology as well as Psychology. And so he had deep roots into the neurology group.
CAF: So what was your dissertation on?
DPS: It was on the effects of brain lesions on sound localization. I published it. I had used two psychophysical methods to study this that agreed *fairly* well. And the method of constant stimuli and the method of—what do you call it—of just pointing. When you point to a stimulus. I don't know.
CAF: You mean pointing to a location where you heard something?
DPS: You point to the location where you hear something.
CAF: Um. What was I going to ask? Oh, where were the brain lesions that would…Were they in the temporal lobe.
DPS: Yeah, the temporal-parietal lesions were the most devastating. And …I found…and found that the localization was worst in the contralateral side of space.

And the difference between homolateral-contralateral was greatest for lesions in the parietal lobe, which gives rise to these big deficits in spatial behavior. Contralateral…the phenomenon of contralateral neglect.
CAF: mmhmm. Oh yeah, yeehI read about that many years ago.
Very interesting.
DPS: Right
CAF: So, you have any…you didn't do any research related to speech until you went to Montreal?
DPS: Well, the curious thing…That's true. But curiously there was an assistantship that I applied for and got, an RA, that was sort of clinical in that it was in the Speech and Hearing Department at the university hospital. And the job was to assess language and…and intelligence, I guess, in young kids who had hearing losses or other problems. Some of them had cleft palates so they…
CAF: Couldn't talk very well
DPS: So I didn't know anything about…I had had very…I had had just one course in developmental psychology at this point. But there I was, put into the situation where I was assessing young kids and so I got…sort of got interested in speech development through this experience.
CAF: OK. Now how did you happen to go up to Montreal?
DPS: Well that was later. I went to Cambridge first as a USPHS postdoctoral fellow. And…
CAF: This is University of Cambridge?
DPS: Yeah. I had gotten, in my last year, I had gotten interested in dyslexia. In my last year in graduate school. That was one of Benton's interests. So he said well why don't you go to Cambridge and study this? I know Professor Zangwill,its one of his main interests.. So I wrote up a proposal, and I got it. And I spent two years there.
CAF: Oh. I remember the name Zangwill. I must have looked into that back in my early graduate years.
DPS: Well, he was one of the pioneer researchers into hemispheric specialization.
CAF: Yeah, yeah.
DPS: And he too got his start as an experimental psychologist who was drafted into the business of assessment of war-related brain injuries. They had two units in Britain, one in Oxford and one at Edinburgh. And Zangwill held down the post in Edinburgh during the war. And a colleague of his, Oldfield, held down the one at Oxford. And after the war, it's kind of interesting that those two became professors at those universities.
CAF: Now, is Oldfield the one who developed a handedness inventory. [R. C. Oldfield]
DPS: Yes, yes it is, yes it is.
CAF: And so, while you were there, did you do research on hemisphere specialization or just dyslexia?
DPS: Well, I stuck to dyslexia, although I was certainly interested other things that went on. And there was a monkey lab there that was ---where they were making lesions.
CAF: Oh.

DPS: And some pretty interesting people came out of there, who were graduate students at the time. Charlie Gross. I don't know if that's a name that you know …He's at Princeton.
CAF: No.
DPS:And Susan Iverson who was…and Leslie Iverson who were…. These were John Salamone's [UConn psychology faculty] mentors when he was a post doc there.
CAF: Oh.
DPS: So
CAF: And how did you study dyslexia?
DPS: Well, I sort of…mostly I sort of blundered along. Because most of the literature was medical and not experimental, and I tried to develop methods of study.
CAF: Interesting.
DPS: And I got subjects in a child guidance clinic, which had a lot of referrals for essentially educational problems. So I had a great time at Cambridge, and I got to know people in the department doing other things. I had friends doing animal work that was beginning to show the importance of the temporal lobes for visual perception. And Larry Weiskrantz was the director of that and he had been a st....He was a PhD of [Karl] Lashley's. In fact, he was Lashley's last student.
CAF: I didn't know that.
17:28
DPS: Yeah. Zangwill had taught Brenda Milner. She took her bachelors at Cambridge. And [Zangwill] kept an interest in things that were happening at the Montreal Neurological Institute [Milner there]. [D. O.] Hebb was the first psychologist that worked there.
CAF: Yeah.
DPS: And then Brenda Milner took over after Hebb became the head of the department [at McGill?] and more involved in other things. Brenda Milner took over that position. So that was a sort of a natural segue for me when my time at Cambridge was done.
CAF: And was that a second post doc?
DPS: It was. It was a second post doc So I had the luxury of delaying…
18:20
CAF: Yeah. Teaching and service and all that stuff
DPS: And I think that was a very lucky thing. Because I don't think I was all that mature. I got my PhD at age 25. And I don't think I was all that ready to…
CAF: Take on all those…
DPS: Take on all those other things.
CAF: Yeah. I think post docs are wonderful. For that reason: You can just focus on developing your research. Now Brenda Milner, what was she…she was doing research on brain-damaged people, but what specifically was she doing?
DPS: Well, she was primarily interested in the lateralization of function in relation to perception, memory, and language. And that was sort of broadly what the research program was about.
CAF: Oh.
DPS: But the subject population was kind of unique, because they operated, it was 50 (15?) patients a year with intractable seizures. And these people were selected,

because the operation was fairly rigorous, the people were selected to be stable personalities and people who would stand to really benefit in terms of quality of life from …
CAF: the surgical procedures.

DPS: …the surgery. So it was the first…it was the beginning of elective brain surgery. Up until that time, I mean it had been, you know, the last stop before the undertaker, so to speak.
CAF: Oh. Now was Penfield were Penfield and who was the other guy [Roberts]. Was Penfield there at that time?
DPS: Penfield was the founder of the Montreal Neurological Institute. He had already retired as director when I arrived. But he was still around. And he was writing his novel among other things….
CAF: I didn't know he wrote a novel.
DPS: … when I was there
CAF: And in what capacity was Doreen Kimura there?
DPS: She preceded me as a post doc with Brenda Milner. She had gotten her PhD at McGill and had been a student of Hebb's and then..
CAF: So was gone by the time…? I thought you learned the dichotic technique from her. Was it just hearsay from her?
DPS: No. We never met until I had been there for more than a year. But she went on to another…She went on to a lab in Switzerland. There was a brain institute at Zurich that was quite famous. They worked only with animals. But they were interested in some of the techniques that Milner and Kimura had developed for studying humans with brain injuries. And so she went over to teach them these things.
CAF: Very good.
DPS: So when I met Bren…but I….So I got interested in dichotic listening definitely through…as a result of the work she did and that was still on going that I sort of took over. But I didn't meet her until a year or two after.
CAF: And how long were you in Montreal?
DPS: Two years.
CAF: Two years in Montreal. OK. And from there you went to Haskins-UConn?
DPS: That's right. I went to Haskins. Not to UConn immediately. I went to Haskins…I came down. I was looking for a job at this point. Most of my opportunities that …seemed to be in medical schools. And I wasn't sure I wanted to spend my life in a hospital environment, And so I didn't find the university position that I was looking for. But Brenda knew about Haskins, had met Al and Frank and was impressed with them. And so I sent my materials, things I had been working on. And they invited me down to give a talk. Ib spent all afternoon talking with Al and Frank, and they said: "Why don't you come?" And Frank said:" For a year." And so I came for a year. A bit of a risk to move to New York with two…with a young baby and with a young baby for only a year. But then it turned into more than that.
CAF: Quite a bit more than that!
[Second file]

DPS: I didn' think about your having to transcribe this. It isn't very compact, I'm afraid.
CAF: That's OK. That's OK. So this is questions 1 and… So it was Haskins first, andhow did the UConn ---I want to make sure this is recording----how did the UConn …?
DPS: Well I'd been at Haskins for a couple of years. Originally, I was going to go to UConn in '67, a year and a half after I arrived at Haskins.
CAF: And how was that arranged?
DPS: Oh, Al sort of invited me to apply, and I came up and met people and so forth. And it was arranged that I'd be appointed. And…But then they asked me to def… if I would be willing to defer for a year, becausethey… I was needed at the Lab.
CAF: Oh!
DPS: They were a little bit short-handed there, so…
CAF: Now at the time you came to UConn, was Arthur…Al was on the faculty, was Arthur on the Linguistics faculty?
DPS: He had come the year before.
CAF: mmhmm And Ignatius?
DPS: Ignatius had come two years before.
CAF: OK
DPS: The first year he was a member of the English department, and was laying the ground work for linguistics.
CAF: mmhmm, that's right. I forgot.
DPS: Yeah. And in the second year, Arthur came. And he came to chair the department. And then they brought in a woman from Quebec., whose name I don't remember.
CAF: What was her expertise? Phonetics.
DPS: Syntax.
CAF: Whoa!
DPS: And second language. And then she left and they brought in David Michaels to do the second language stuff. But he was a phonologist and …So Chomsky came to UConn via David Michaels. Because David Michaels…
CAF: What do you mean Chomsky came to UConn.
DPS: I mean the Chomsky point of view.
CAF: Oh! The Chomsky point of view. Oh, now I had blamed Howard Lasnick for that.
DPS: Well, Howard came later you see. They hired Howard five years later or something.
CAF: I think Howard's the reason why it became *only* a Chomsky department.
DPS: Oh, for sure!
CAF: Yeah. David didn't…
DPS: David was strongly…
CAF: A very theoretical phonetician…phonologist
DPS: Strongly influenced by the Chomsky-Halle point of view.
CAF: Yeah. And in Psychology, there was just you and Al?…I mean maybe…Len
DPS: Well, three of us came the same year. Dave Yutzey, Ben Sachs and me. We were the hires for 1968.

CAF: Wow, that was a good year. But I was thinking of Haskins people there. Were there…So was Len there already, but he wasn't at Haskins?
DPS: He wasn't at Haskins until later. Michael Turvey and Len were already here.
CAF: They were, OK.
DPS: They came a little bit earlier. I think Len came, maybe in '65. Turvey came …I don't remember the year, but it was a little bit earlier than...
CAF: Yeah, maybe it was '67. I don't know why that jumps into my head, but yeah, OK
3:17 Check above
CAF: Al, I guess, had a lot to do with there even being a linguistics department.
DPS: Oh, it was his…it was his brainchild.
CAF: And how about Phil Lieberman? When would he have come relative to you.
DPS: Phil came.. Phil had already been at Haskins. Phil had been full… had been at …a full time researcher at the Air Force Cambridge
CAP: Cambridge thing, yeah.
DPS And he was leaving that. And he was, I think, at least part time at Haskins before he came to UConn.. And then he remained at Haskins until he went to Brown.
CAF: OK.
DPS: I was very interested in Phil's work. And I was very interested when I got working on vowels with Pinky Strange and Bob Verbrugge. We were very interested in Phil… Phil's theory of how speaker normalization…occurred
CAF: I don't even remember his work on that.
DPS: Well, he believed that the point vowels were sort of a calibration.
CAF: Oh, that's where that came from. I see. And it turns out they weren't.
DPS: It turned out they weren't so we had a sort of a parting of the ways over that. Although we've stayed friends.
CAF: He's a very bright guy. I mean he wrote a beautiful [book]. I think it was his dissertation, *Intonation, perception, and language*. It just had a beautiful motor theoretical account of intonation perception.
DPS: I think he's very good. He's not always balanced. But I think he's very smart.
CAF: A little crazy. But smart. Yep.
DPS: But smart. I agree.
CAF: So Michael Studdert-Kennedy would have been at Haskins at the time you arrived? Or was that a little later?
DPS: No, he was there before me. He…there was first Kathy then Michael. First Kathy, then Arthur, then Michael then me.
CAF: OK. So when did you start your collaboration with Michael on dichotic listening?
DPS: You know, I can't remember. I know it was very early. It was within a few months after my arrival. And I started working with Kathy also within a few months after my arrival.
CAF: Different interests. Right, I mean…Was hers…
DPS: Right. Well, I can tell you how that came about. There w…One Haskins person who had left by the time I arrived, Lou Gerstman. You…
CAF: mmhmm

DPS: Lou Gerstman was a very bright guy who was into all kinds of things. And one of the things he was interested in was aphasia and speech disorders. And he had been a consultant for a number of years to the Institute of Rehabilitation Medicine at NYU.
CAF: Yeah.
DPS: And when he went to Bell, I guess, he left that. And so there was a sort of opening there. And Martha Sarno, who ran the speech pathology department there was looking for somebody else who could help her understand more the kinds of production disorders, basically, that occur. And Kathy knew her. I'm not quite sure. But anyway Kathy knew that I was interested in aphasia. And so she recommended me. And I went down and gave a talk and stuff. And it seemed like a pretty good fit. And so it turned out a half a day a week I spent at their shop. It was on 34th St and First Avenue, so it was not a long walk…
CAF: From Haskins.
DPS: From Haskins. And Kathy, though she wasn't formally there, she was very interested in the work, and she became a colleague on that. We did studies to… to try to sort out the different varieties of production disorders that may occur with brain lesions are likely to present at an aphasia clinic. We used control materials and …that were phonetically controlled, and studied the errors by confusion matrices. This approach had only been taken by Ilse Lehiste who was the only predecessor we could find for doing that kind of thing. She wrote a monograph on dysarthria.
CAF: Oh, did she? Wow. I never would have guessed.
DPS: Then later we did, I think, for the first.. EMG study of an apraxic speaker, a couple of apraxic speakers who webrought into Haskins and put these...
CAF: Were they the needle electrodes?
DPS: No, they were…
CAF: The surface ones
DPS: The surface electrodes. And that paper is still once in a while is requested. We wrote it up for the *Archives of Physical Medicine and [Rehabilitation]*
CAF: mmhmm. So you were doing that work at the same time that you started doing the dichotic work with Michael?
DPS: That's right. And the thrust…early thrust of the work with Michael was totry to figure out whether meaningless structures that had phonetic content would show the same kind of laterality [as meaningful speech].
CAF: Yeah. So there was something I didn't understand. I was interested in the huge change in Al's thinking between his '57 paper and his '67 paper with you and Michael and Frank where he sort of shifted from being a behaviorist to being a biologist. And I thought, well, it was that Chomskyan revolution. And Michael says, "no, it was this dichotic stuff" Where he realized that speech was kind of intrinsic to language.
10:34
DPS: Well, I think that Michael might be a little bit right, but I think that you're *more* right. I really think that Al was very interested in the cognitive revolution.
CAF: Oh, he was. OK
DPS: And that's one of the reasons that Jim Jenkins came to Haskins Labs.
CAF: I knew Jim was, yeah.

DPS: But Al was very interested in…was very interested in hemispheric specialization, because he thought that this was a way to understand reasons why results from studied speech were not…
CAF: Weren't what you would expect from…auditory perception.
DPS: Were not what you would expect from auditory perception and psychophysical work generally.
CAF: Right, right. Yeah. I can see him, even if,…especially if he was interested in the cognitive revolution, once he saw this right ear advantage for consonants especially, he would say: "Ah, now, I'm part of this," right, because…?
DPS: Yeah. The enormous interest that he had in categorical perception at the time sort of fed into the view that the left hemisphere is digital and the…
CAF: Right, analog right hemisphere. Right.
DPS: right hemisphere is….
CAF: Have you kept up with that? I mean, I did a lot of reading in that area, not the weird spacy kind of stuff, but just global vs analytic. Is there still considered to be something in that or not? Hickok or somebody has a view about, I don't know, high vs low spatial frequencies…something like that. I don't know.
DPS: I think the left hemisphere is temporal
CAF: Temporal.
DPS: Yeah, temporal. And it's interested in in a different kind of temporal scale than the right hemisphere.
CAF: Yeah. I just haven't kept up. I was quite interested in that work. Then you and Michael got interested in…
DPS: We did. We just tried to make a fully controlled study with stop consonants and vowels and…
[What was novel was using meaningless stimuli, so that lateralization for phonetic properties could be looked at]
CAF: Right. Well it took off when you think about it. Terry Halwes did his dissertation on that. And Bruno Repp did a lot of…did a ton of work following up on that.
DPS: And Ruth Day. Of course, Ruth Day was really interested in something else. She was interested in fusion.
CAF: And kinds of people, I think. [language bound, stimulus bound]
DPS: People who readily showed fusion and people who didn't
CAF: Right.
DPS: But…And Ruth Day was…Frank Cooper was very taken with Ruth Day. And I think that he was very crushed that ultimately it turned out to be…nothing very solid came out of it.
CAF: Yeah. What was he taken about? I mean she was a very charismatic person. She took people. I know she took people who wanted to clinical psychologists and made them experimental psychologists while they were in grad school, and then they gradually became clinical psychologists again.
DPS: And she must have been an excellent teacher in a way, because…. And she did attract some good people…Jim Cutting.
CAF:Yeah, Jim Cutting, Mark Blechner, You know, he was a good Haskins student, but he became a clinical psychologist later. My friend Jim Vigorito who did that

classic study with Eimas [Eimas, et al, 1971] when he was an undergraduate, also was a Ruth Day student who went back to clinical psychology once his time at Yale was over.
14:22
She just was very…she was great at attracting people, getting them enthusiastic about what she was doing. No matter what they wanted to do.
DPS: Curious to know if she's still doing it now.
CAF: You know, I don't know. She's at Duke.
DPS: She came to the…
CAF: She did! I talked to her very briefly.
DPS: to the opening. To the…
CAF: The Haskins 2005 thing. Yeah
DPS: But Alvin became very embittered.
CAF: Yes, he did.
DPS: And F.., alright, […??]
CAF: OK so I was going to say: You and Michael went on…at a time I began to know you guys, you were very interested in the relationship between ear advantage and manual laterality. Whether there was a relation between handedness…
DPS: I think that was a bad move. Not that was…not that it was an uninteresting question, but it...
CAF: It was a reasonable question and it was very frustrating, if I remember.
DPS: It was something we didn't have the tools to tackle at the time. And, in the end, I became… we both I think became less enamored with dichotic listening as a research tool, because of the difficulty in interpreting differences in the magnitude of the ear advantage. I mean, it's not an artifact that you get these material-specific effects. But the size of the ear advantage is a matter of not just hemisphere specialization but also ipsilateral loss.
CAF: Yes, right.
DPS: As I think Michael put it. And Chris Darwin and others showed…
CAF: Chris Darwin and Susan Brady for her dissertation that if you had short close together vowels they gave you ear advantages kind of like consonants did.
DPS: Chris showed that in some of his early work.
CAF: Yeah. Susan was somehow related to that.
DPS: Anyway, the whole thing, I think, eventually toppled of its own weight.
CAF: Yeah, but it's an interesting question. I mean why is language on the same side as….
DPS: The questions are still there!
CAF: I know. You know, fads just…
DPS: But think that ERP, for all its problems ,is the better tool for studying these things.
CAF: Yeah, could be. Is it being studied that way?
DPS: Yeah. By the Chinese student that I talked to yesterday. Susan Shu…I can't think of her name S-H-U-E-Y.
CAF: Uh huh. And where did… She was here?
DPS: She was at…Well, she's at Haskins now. She's the wife of Tao [?] the man that Dave Braze hired from Hong Kong. And she's a computational linguist.

17:11
CAF: Oh, that's right. You said you were going to talk to her. Right, right.
DPS: She's very interested in pursuing this further. And there's somebody else at the Labs now who is also.
CAF: Interesting. Gee... Well maybe it will start up again in some new way…So another thing to talk about, I guess, is how you developed an interest in reading and how the Laboratories developed an interest in reading in general.
DPS: I already had the interest in reading as you…as explained. But I met…Al brought Isabelle to the Labs to talk to me and we quite, not terribly long after I arrived there, because he knew that was one of my interests. And at that point, she was making a career change. And…
CAF: From clinical to education.
DPS: Right. And she had an NIH Postdoctoral fellowship that was especially designed for people who were willing to do that. Make a…
CAF: Oh wow.
DPS: And allowed her to go and visit to places were work on reading was going on. She made visits to 10 or 12 places. And we talked about that, and I convinced her that the place to begin was to look at laterality patterns in…which I think turned out to be a bad choice.
CAF: Yeah?
DPS: But that's where we were for the first year and a half or so.
CAF: Now, was that because left handedness is overrepresented in dyslexics? Or maybe I'm saying that backwards, but…
DPS: Yeah, there were a number of reasons for it. But it seemed …partly because Orton had taken that stance toward dyslexia.
CAF: Oh, had he?, mmhmm. Oh, I guess you're right. I had forgotten that. Right. That they weren't as lateralized as ordinary folks.
DPS: That's right. And Zangwill had held the same view. And so these were ideas that were certainly kicking around at the time, and, given my interests, it seemed like a reasonable place to start. And, it just didn't go very far.
CAF: So did you try dichotic listening tests?
DPS: Yes, we did.
CAF: You did.
DPS: We had a …I think Isabelle had a little bit of…some funds left over from her post doc, and we hired somebody to…who began getting data at UConn , before Isabelle was, I think, a member of the faculty there.
CAF: Do you remember who that was?
DPS: I probably could dredge up her name, but she didn't have any…she never became a student.
CAF: She wasn't a grad student.
DPS: She was not a graduate student. I think she was a grad student at Wisconsin or somewhere.
CAF: OK. And did any of that get published, dichotic listening and dyslexics?
DPS: Yes, there was Charlie Orlando's dissertation.
CAF: Oh yeah, I remember that name.

DPS: And there was a paper that looked at…We moved from there to reversals. We thought there'd be a…We published a kind of debunking of reversal theory.
CAF: Yes, I remember that.
DPS: That was the first, I think, paper we wrote together. We tried to publish that in *Developmental Psychology*. They turned it down; they said it wasn't really developmental. And so we ended up publishing it in *Cortex*.
CAF: Uh huh, yeah. I didn't remember where it came out. Ok. But of course the work on reading really blossomed after that. Now, was Isabelle always interested in learning reading, development of reading and reading disabilities?
DPS: She was interested in the educational side of dyslexia and reading disability and became more and more interested in the teaching of reading.
CAF: Learning. Yeah. And I'm trying to put that together with research that got underway exploded on visual word recognition in skilled readers. I guess…Would that have started with the friendship between Michael Turvey and George Lukatela., I guess? I'll have to interview Michael to find that out. But…
DPS: Well Len [Katz] was also interested in…Len was interested in things like bigram frequency, and he…
CAF: Yeah, right,
DPS: He first worked with Dave WIcklund on these kinds of things.
CAF: I think I remember some publications that they had.
DPS: Then there was a student of Len's, Millie Mason, who became a…
CAF: She overlapped with me. I remember her.
DPS: She published quite a lot.
CAF: She did a great dissertation. I can't remember what it was on now.
DPS: Well, it was,…it was on measures of redundancy in letter strings.
CAF: Ok Yeah, she was very good….So I kind of thought a basis for all the interest in reading, and I think I'm wrong now, was just that Al was developing these ideas of there being a specialization for speech perception. He didn't have the idea of the module yet. But then it should be understandable why reading's hard. And I guess you wrote about that. But even sort of puzzling that you can take in language by eye. 23:43
Right, because you've got this specialization, which is all about what to do with this complex acoustic signal that comes in your ear, and how do you even.. how do you access language through your eyes. But maybe that became… I mean Ignatius wrote a very nice paper kind of about that in the Feschrift for Al much later.
DPS: Well Ignatius was early on… In fact, in the early seventies, possibly before you came…Ignatius, and Isabelle and Michael Turvey and I team taught a graduate course on reading.
CAF: Oh! That was… I'm pretty sure that was before my time. I'm sure I didn't take it.
DPS: We only did that once. Which was kind of too bad, because we…
CAF: Yeah, it would have been a terrific course to take.
DPS: Well, I'm not sure it was a terrific course. But it was stimulating to us who were doing it
CAF: Well, it would have been a nice team. I mean, he [IGM] was such a deep theoretical thinker and then there are sort of practical matters that other people

might have had more at the forefront of their minds. And it would have been a very nice way to be exposed to that field.
DPS: So Ignatius was an early player in the work on reading.
CAF: He was.
DPS: Yeah. I mean he was partly stimulated…That interest was partly stimulated by Emily [Mattingly] who was a reading specialist in the schools.
CAF: Oh, really. I didn't know that...But it seems like there were separate streams. There was the work that you and Isabelle developed on beginning reading and reading disability. There was separate work on visual word recognition that was Turvey and Katz, and Laurie [Feldman] certainly jumped into the Serbo-Croatian two alphabets thing. Who else would have been…besides Ignatius would have been involved and Len of course in the
DPS: Well, later Stephen Crain, of course, was involved in the reading studies .
CAF: In the reading studies? Oh, I had him in a completely different pocket. What did he do in the reading research?
DPS: Well, he was interested in the question of whether these people have a deficit in processing or a deficit in knowledge, which was an issue that….
CAF: Oh really! Which is an issue that has persisted, hasn't it?
DPS: Right. That was…
CAF: Of course! I know that.
DPS: an issue that he was especially interested in. He and I published something like 15 papers, coauthored.
CAF: Wow!
DPS: Over a period of…I guess we started working together in the early 80s. Before 19…Yeah because we…, yeah about 1983 and for the next seven years we did a lot of work together. And then he left the university in the late '90s.
CAF: Did he?
DPS: He went to University of Maryland and then..
CAF: Right, And then to Australia, where he still is
DPS: To Macquarie where he still is.
CAF: Well, he is a very special person. I admire his research on children's language acquisition, even though I think that theoretically, completely dead wrong. I just think he did beautiful research.
DPS: He is a good experimentalist.
CAF: Yeah. He really is.
DPS: And a good thinker.
CAF: Yeah. Oh, he is. But how you get you know 3 year olds to evaluate these complex sentences and even to say them.
DPS: He has this very stubborn idea that 3 year olds are practically adults, if you
CAF: If you test them in the right way.
DPS: If you test them in the right way.
CAF: They know things that they could not possibly have experienced.
Alright, well I guess some other questions were about…How well did you know Caryl Haskins. I guess not all that well.

DPS: Well that's an easy one. Not at all. I mean, he.. .When Caryl Haskins came to the Lab in New York, which was infrequently, he wouldn't…there would not be any kind of gathering.
CAF: Really! 'Cause he probably wouldn't allow it. I mean he was so..was such a modest man.
DPS: He just snuck in. I think there was some social occasion. Frank had an apartment in New York, and I think that he threw a kind of social thing once. Some of us came, and the Haskinses were present. But I never, hardly ever, laid eyes on him in Haskins Labs.
CAF: That's really too bad. He was just a very, very modest man. My last question was about: Did the move to New Haven change the research in any way.
DPS: Well, I think it did, quite a lot, because it opened up new opportunities.. ..
CAF: And did it shut off any old ones?
DPS: Well, it shut off the possibility of Kathy [Harris] and I working on speech disorders with the population from NYU. Although we did continue working together on this in some way…
CAF: Very slowly over a long period of time.
DPS: Yeah with much interruption
CAF: But I suppose the move to New Haven made the Laboratories more accessible to grad students from UConn and Yale, so maybe there was a greater presence of…
DPS: And Ruth Day brought a lot of students there.
CAF: A ton of them.
DPS: And Alvin brought students. He had a year at MIT where he was very influential. There were a number of students in the Psychology Department there. I'm thinking about…Having said that, I can't come up with the names.
CAF: Would he have been in Ken Stevens group?
DPS: No. They were in the…
CAF: IN Chomsky's group?
DPS: No, they were in the Department of Brain and Cognitive Sciences; that's where Alvin was…
CAF: Now, who would his colleagues have been there, not grad students, but faculty?
DPS: Well, Susan Carey was there, as a development of speech person. …If you hadn't asked me I could have told you.
CAF: Yeah. Well, think about it, and if it occurs to you, let me know.
DPS: Merrill Garrett was there.
CAF: Oh, of course! Now, do you have any idea when this was. I would have said, not in my time there, but maybe it was, and I just didn't remember it. So I came in 1971, and Al was in Japan for the semester, the very first semester I came, I think. I didn't meet him right away. Would he have gone to MIT after that? Or before that.
DPS: After.
CAF: After that. Yeah, so…
DPS: In fact, one of the reasons, I think that I started working with Michael [Studdert-Kennedy] and Kathy rather than Al was that Al went off to Stanford with…Al and Frank went off ..
CAF: Oh yeah, Al and Frank. That's right; they had that year.
DPS: Not long after I arrived, so he wasn't around.

CAF: So you think that there was a grad student or two who came from MIT because of Al's influence.
DPS: Oh, there definitely was. I'm sorry right now I can't think of names, but Then we had a bigger group here of graduate students [at UConn]. Like Michael Dorman…
CAF: Yeah. Mike Dorman, Bob Port, Tim Rand, Gary Kuhn, Terry Nearey.
DPS: Earlier, Bob Porterwas earlier
CAF: I think that Bob Porter must have graduated like the year I came. Because some how I knew of him more than I knew him.
DPS: And I taught all these people. It was much more of a shared endeavor.
CAF: I know. I thought when I came that the Linguistics Department and the Psych Department were extremely close. I was as close to Bob Port and Terry Nearey as I was to Susan Brady and whoever else was here [in Psych]. And they were outstanding students too. At the time I came, I thought the Psych Department had some absolutely abysmal grad students. And then they had Claire Michaels and Susan Brady and a couple of other people who were really good. But the Linguistics Department had terrific ones.
DPS: There was a woman too who was here who went to the place that Gary Kuhn did.
CAF: Hollis Fitch?
DPS: Hollis Fitch.
CAF: Yeah, she was a little younger than me, more junior than me.
DPS: Yeah, and then Betty Tuller came a little bit later and
CAF: Betty Tuller. And Laurie Feldman
DPS: Laurie. See we had quite a special group of people.. And they were all…
CAF: Remez and Rubin. Don't forget them.
DPS: Absolutely, and they were totally involved in the Haskins research program. Everyone of them.
CAF: Yes, yep.
DPS: So yes, the New Haven opened these opportunities. It also expanded the w(ork) …The speech production laboratory was much expanded on Crown Street than it had been in New York.
CAF: Yeah. Is that right?
DPS: More people involved in it.. Tom Gay was also there with students
CAF: That's right; he was.
DPS: until he fell from grace.
CAF: What happened there?
DPS: Oh, I think it was mainly his own fault. He kept rather a…made it seem in a grant application that..
CAF: Taking credit for things that…
DPS: Taking credit for things that…
CAF: Well, I'm just…in our paper, I'm just reviewing the work of Kathy and her students…You know…Think of Freddie Bell-Berti and Carole Gelfer and Suzanne Boyce. She had a terrific…she was a terrific mentor to these typically young women. There was Larry Raphael as well, but typically young women. They did beautiful work. Really nice work.

DPS: Well Kathy was a very nice person to work with. She was scattered-brained, but she was always very smart.
CAF: You know, it was surprising to me…She was, is very scattered. But she just kept these lab notebooks down in the [speech production] lab that were just…You know, I should have kept notebooks, like that. I never did, but…How could a person…
DPS: She was a great teacher. I mean I learned a lot about speech from Kathy. So yeah
CAF: OK, so what else should we talk about? Is there anything else?
THIRD FILE
DPS: So the influences on Alvin that, I think, for sure, the one from dichotic listening was one of them, but there were plenty of others that were moving him in the same direction, I think.
CAF:Well, he's an interesting guy, because, I think Michael has verified my feeling that Al was not a scholar. Its not like he sat down and read a lot of books and acquired knowledge that way. But what he was was a very social guy, and he would go to conferences and meet people and …
DPS: And intuitive.
CAF: And intuitive. But I think of how interested he got in Fodor's Modularity of mind. And it was probably parties he went to and talked to Jerry about it. [Jerry Fodor lived near UConn for some years]
DPS: See, Al was very dissatisfied with Psychology as he found it…with the structure of Psychology as he found it. Very critical. And…
CAF: Yeah. In what ways was he unhappy with it?
DPS: Well that was pardigm oriented rather than issue oriented. And people would just ring the changes on…
CAF: I guess that's true. It's so much easier to do that…
DPS: And he blamed the verbal learners for this kind of thing. And Jim Jenkins came out of the verbal learning tradition, and he rejected it. And he remember a paper of his: Remember that theory of memory…
CAF: Well, forget it! [American Psychologist, 1974]
DPS: We're thinking of the same one. And he went thru several periods of embracing radical ideas.
CAF: Someone should write a biography of him.
DPS: Embracing Chomsky, embracing…
CAF: Probablyg behaviorism back in the day. Throwing that away
DPS: Embracing the kind of Ulric Neisser kind of program. And um…Nowadays Beth Loftus gets all the credit for false memories and stuff, but Ulric Neisser was, I think… did the spade work for that kind of thing
CAF: Did he?
DPS: Showing that memory is constructive, rather than veridical
CAF: Yup, yup, that's true. Well, I think somebody should do a biography of Jim Jenkins, because, to me, his greatest contribution was his student..his students. And he was just a catalyst. You know, you think about particular experimental findings of his, and you don't…it's hard to find them. But you think of all the students he galvanized. And he'd just go give a talk and people would be enthralled. He was a very special guy that way.

DPS: He was.
CAF: So who's going to write his biography?
Well, what else did we not touch on that we should include?
DPS: Well we've touched on what was going on in New York at the time, pretty much.
CAF: Yup. And Michael filled in his part of it.
So were you never tempted to leave. Was Haskins and UConn fulfilling enough that you weren't tempted to leave?
DPS: Pretty much. I…I was…No, I was pretty much happy with the people. Some years were better than others, of course.
CAF: I had a hard time leaving graduate school. I just thought this was…the combination of UConn and Haskins was just so perfect, I didn't really want to be someplace else.
Alright., well, I guess we are done, but if you think of anything else.
DPS: One thing that occurs to me that might be worthwhile if you really wanted to pursue what was happening in Psychology
CAF: triggered Al's…
DPS: that triggered Al's…is maybe have a conversation with Michael and me.
CAF: Great Yeah, that's a great idea. A great idea.
DPS: Because we might sort of bounce off of each other. We have very different backgrounds. I mean he was… But he was exposed very strongly to the Skinnerian stuff at Columbia and then the psychophysics.
CAF: Right. Now I'm sort of forgetting what he said, but we've got it in his oral history. But someone suggested that he read Chomsky and that just completely… Someone had Michael read some Chomsky and that just changed his way of thinking about things.
DPS: I was very interested that Len reported on how he…his early meetings with Al. He met Al when Al was at the center and Len was a postdoc at Stanford and doing mathematical psychology. And he met Al and had a talk with him, and Al gave him a copy of *Syntactic structures* [Chomsky, 1957] and said: "Read this and tell me what you think of it."
CAF: That's quite a …quite a challenge. Well, I wonder if Al wanted to know if the …what do you call it…kind of artificial language stuff that Chomsky was writing about it, whether he really understood it or not.
DPS: Yeah.
CAF: So did Len come to UConn because Al brought him to UConn after meeting him there?
DPS: Well Len had heard that there were positions at UConn. I don't know how he got that information. And I think he sought a meeting with Al. And..
CAF: Well, that was good for him. He was a student of Jerome Myers at UMass, right? The guy who wrote our stat book that we used.
DPS: I didn't know him.
CAF: He wrote a stat book that Len used I our graduate stat class that I still have a copy of because it is the only way I can understand ANOVAs now. So then he did a post doc at Stanford. We'll have to get a history from Len as well.
Alright.

[New file 12/4/14]
CAF: Alright. This is December 5, 2014. Carol Fowler and Donald Shankweiler. We are continuing the oral history to pick up a couple topics that we neglected last time. So we were talking about a year?
DPS: A year.
CAF: a year that you spent in Minnesota in 1972 we decided it was.
DPS: In 1972 and 3
CAF: OK. Why don't you talk about how you got started on that project.
DPS: Well, there were…I can't remember exactly how the vowel project got underway. But I can tell you about three maybe three things that were relevant to it…reasons why I got interested in this project. And one is…I had learned…I had already worked on the Psych Review paper with Al and Frank and others [Perception of the speech code, Psych Review, 1967] and I 'd read quite a bit of the Haskins literature on speech. And I was impressed by…first by tape cutting experiments that had been carried out somewhere by somebody called Carol Schatz [later Carol Chomsky]. And it was pretty clear that you couldn't separate vowels and consonants by cutting tape anywhere. So if you have a syllable like *go* you couldn't isolate the consonant from the vowel no matter where you cut. I mean you might not get the /ou/, but you would get some vowel whatever segment was…you listened to. So there were the tape cutting experiments. There was the spectrographic stuff that I had learned about and…that you couldn't find any stretch of.. along the…any slice along the time axis of a spectrogram that conveyed linguistic information unequivocally.
CAF: Right. In a discrete way.
DPS: Right. And then the third thing was that the experiments that were done at Haskins that I had learned about so recently and in great detail that …how the information-bearing parts of the signal were located experimentally. So I had this kind of background.
CAF: Now thinking back to the '67…the Psych Review paper that you mentioned, it seemed even there that Liberman anyway drew a line…not drew a line, but drew a distinction between highly encoded segments on the one hand and vowels on the other.
DPS: That's right. And of course I was very much involved in that. And I published papers with Michael [Studdert-Kennedy] on vowels and consonants and showing that under certain circumstances they were differently lateralized.
CAF: Right. So you got a clear left…right ear advantage for consonants but pretty much no ear advantage for vowels.
DPS: But of course, others showed that you could get an ear advantage for vowels
CAF: If they were short and close together
DPS: If they were short and.otherwise difficult and so forth. So I began to be…I wouldn't say that I disavowed the importance of the vowel-consonant difference, but I felt that Alvin had almost a prejudice against vowels.
CAF: I know and it seemed like a very odd…
DPS: He didn't think they were respectable citizens at all.
CAF: They weren't quite speech.
DPS: They weren't quite speech, you know.

CAF: That would be interesting
DPS: And one of the things that had got me interested in vowels was Phil Lieberman who was… had come in '69 I think to UConn and he was also at Haskins.And I spent quite a lot…I found him a fascinating person and I spent a lot of time talking to him. And in this little book …I'm sure you've seen it.
CAF: *On the origins of speech*, yeah.
DPS: He talked about the evolution of the vocal tract. He talked about…and he has a story about speech perception in there. And he picked up the question of how we lock into the speech system of a strange talker particularly one of a different size.
CAF: Of a new speaker, yeah. Right.
DPS: So…And I later discovered that that problem had been pointed out by Joos…Martin Joos in his monograph, who said that this was a problem, a big problem, for theories of speech perception. And Lieberman had taken up this story, and he believed that, following Joos, that the point vowels were important for locking in on a new speaker.
CAF: Right. For the size of the vocal tract, because it gave you the dimensions of it.
DPS: Yeah. But, as far as we could tell, Lieberman had no evidence for this except plausibility.
CAF: Right.
DPS: And so that's I think the first experiment that we did.
CAF: I kind of remember that. I didn't remember it was the first one.
DPS: And Verbrugge was very interested in this. And Pinky Strange and so we rounded up a motley group of talkers and had them produce CVC nonsense syllables and then we compared the error rates of listeners when each instance was a different talker and when the same talker produced everything. So there was an advantage to same talker as you would have expected.
CAF: Right .Right.
DPS: But the advantage to same talker was not greater when there were precursor /i/, /a/, /u/ syllables.
CAF: So you would have the same speaker say /i/, /a/, /u/ and then the CVC to see if that improved?
DPS: And then the CVC….And that made essentially no difference.
CAF: And What I kind of remember…am I right?... that performance was pretty close to ceiling anyway, wasn't it? I mean you didn't have a lot of room to get better, because it was pretty, surprisingly good.
DPS: That's right. That's right. Although, for whatever reason, our error rates were somewhat higher than Peterson and Barney's which was an earleir experiment that was done somewhat along the same lines. So that was the normalization angle. And then the other thing we were interested in was the coarticulation of consonants and vowels and the consequences of that.
CAF: Right.
DPS: And so we did further experiments to quantify that effect by comparing errors…error rates to a situation where the vowels are always in the same consonantal frame versus when they are in different consonantal frames.
CAF: So you didn't compare CVCs to isolated vowels.
DPS: Well we did. Oh yes we did. And we did that too.

CAF: Uh huh. And what was the outcome there.
DPS: Well we found a three-fold difference between error rates in isolated vowels versus CVCs. We later…And that has generally held up although it really depends on a lot of factors how large that difference is.
CAF: So what was the difference? So people were better at isolated vowels?
DPS: No no no no. They were…The error rate for isolated vowels was three times that of…
CAF: Oh, three fold meant… I thought you meant there were three results…
DPS: Yeah, yeah.
CAF: Ok so the error rate on isolated vowels was three times as high as on vowels in CVCs, which in itself might surprise a lot of people
DPS: That's right.
CAF: Because you've got this nice clear signal that you get when the vowel's produced at its target and that's not as good as putting it in a CVC where it's coarticulated with something else.
DPS: Right so it seemed to us to be a rather dramatic refutation of the target idea. And where was I? Let's see.
CAF: So then you said you made a comparison between the same C context vs varying the C context.
DPS: That's right.
CAF: And what happened there?
DPS: That there wasn't a lot of difference as I recall, between the varied…There was an effect of same consonantal frame… an advantage of same consonant frame, but it wasn't that great, But anyway, we could…so the important result was the difference between isolated vowels and vowels in context. I kind of carried that on after I left Minnesota with Pinky. She made several visits to Haskins Labs. Jim Jenkins got involved in it too.
CAF: That's right, he did.
DPS: There were several people who got involved. One of the graduate students here, Brad Rakerd, was involved. Again that…then there were other UConn people who were interested in this. Terry Nearey had done a thesis in the Linguistics Department with Phil Lieberman as his advisor on…testing….a sort of empirical comparison of phonetic feature systems for vowels.
CAF: Ah, that's what it was.
DPS: It was a very complex thesis, though. I never, ever totally understood the results of it. But, anyway he became a player in this. And he and Pinky, I think, have gone back and forth quite a bit over the years.
CAF: Did you do acoustic measures of the vowels in the CVC contexts to see if they, as it were, hit their targets or didn't?
DPS: Yes, we did. And I think the point at which I kind of dropped out of the project was endless measurements of spectrograms.
CAF: Yeah. It takes a lot of patience.
DPS: I didn't have a graduate student who was interested in this, and, I didn't have… we didn't have really grant support that.. So it was…I mean at that point I had three projects going on. I had the… I was still doing dichotic listening stuff with Michael and we were trying to look at covariation between manual laterality and…

CAF: Yeah, that's what I remember.
DPS: perceptual differences. We were…I was following up on early results of phonological awareness stuff with Isabelle and you and others. who were. And that was heating up and taking more time. And this was a third area, and that…something had to go.
CAF: Yeah, and that was it.
DPS: And that was what had to go. And although I'm proud in a way that Pinky and several others kept going for years on this. I think it was largely the basis for Pinky's later career.
CAF: Right, so it was after you left the project that she did the silent centers…
DPS: After I left the project, she and Jim Jenkins together did the silent centers experiment which I think was the sort of coup, the great coup.
CAF: Yeah, that was very clever…to isolate the formant transitions as excellent sources of information.
13:07
DPS: But I wanted to write up…Before these papers…Two experiments had been done: the ones evaluating the effects of CVC context with Pinky and the normalization question with Bob Verbrugge. The three of us were equally involved in all these, but he happened to be the coauthor…the first author of the normalization paper and she of the other one. And I wanted to sort of get closure on this. It was in 1974, and so I wrote in 1974 this paper that was subsequently buried. It was—I was just looking at it here-- "Speech and the problem of perceptual constancy" I called it.
CAF: Right! I remember that.
DPS: And it was a summary of the results that we had and trying to put it into some kind of a theoretical framework and historical framework too looking at earlier work that was done. But I think that the paper I think had zero impact, because it was published in, buried, in this book that Bob Shaw and John Bransford edited. It was a nice book that had several things of interest in it. But I don think
CAF: Oh, it was. But speech people wouldn't necessarily think to look in it.
DPS: Right. So I think it should have been sent to a journal. And I think it was good enough to go in a good journal. But anyway it was too bad. And another bad thing that happened is that it was delayed. The paper was essentially written in '74 and it didn't come out until '77. By that time…
CAF: That's one of my least favorite things about edited books. They tend to be very slow.
DPS: Right and by that time, I think that Pinky's paper came out earlier and maybe Bob's. Anyway I think that these other papers were already out by the time that this preliminary write up had appeared.
CAF: Shucks, yeah. OK, Well I think we didn't say it on tape, so let me just say: . Bob Verbrugge was a graduate student at University of Minnesota then. And Pinky was a post doc there. And you did this work; you started this work when you were doing a kind of a third postdoctoral year, 1972 in Minnesota.
DPS: Right, and I taught some…It was a terrible year for Jim Jenkins, because his son died, Ricky, died of cancer that year. And..So it was a terrible year for him. I took a

number of classes of his for him. It was his seminar in speech perception, and Joanne Miller was in that…
CAF: I was going to ask you that…
DPS: And Randy Diehl was in it
CAF: Yeah, same vintage! Yeah. Now Joanne would have been in the Communication Sciences Department; Randy probably in the Psychology Department.
DPS: Yes. That's right.
CAF: But still a cohesive group of speech people. That's great.
DPS: That's right. Yeah. But…So there was quite a lot of interest both in Minnesota and at Haskins on vowels, vowel studies. Tom Gay was another person who did studies of vowel production.
CAF: Right. So coarticulation, lip rounding? What?
DPS: Yeah, I believe. It's been a long time since I've thought about it.
CAF: And then…So Chris Darwin would have been at Haskins around '73, or '74, and that's around the time he did that study of having short duration vowels,
DPS: That's right.
CAF: with… acoustically close together and getting a right ear advantage for those.
DPS: Right. And…The vowel stuff got rather embattled as things naturally do..I mean, there was a paper that came out from somebody at of Bell Labs showing that if you… under optimal conditions, the difference between isolated vowels and vowels in context can disappear.
CAF: Oh. Uh huh
DPS: And Pinky had to deal with that. And there were also claims that some of our results were due to the fact that we used… or required reading an answer sheet that had orthographic representations…
CAF: I dimly remember that there were a whole bunch of issues about how you got the responses.
DPS: So there…Like any project. Once the data… once it reaches a certain point there are a lot of methodological challenges that have to be dealt with.
CAF: Right, but it means that people were surprised by the outcome, right?. I mean, people would have ignored it if it was just what they expected to have happen.
DPS: Right. And I remember Pisoni was not completely friendly to these findings either. And I was trying to look up the other day…trying to perk my memory on that, but I can't remember exactly what the bone of contention was with Pisoni. But there was one.
CAF: Yeah, I'm trying to remember. Yeah, well he was kind of Mr. Methodology, so he probably had concerns along those lines.
19:12
Alright. Now, I want to shift gears eventually. Is there anything else we should say about this project?
DPS: That's about what I can say about it at this point without delving into it more.
CAF: Alright. OK so the other topic I thought we should cover was the phonological deficit hypothesis. But I realize we didn't say a lot either about phonemic awareness, so maybe we could start with phonemic awareness and then go to the phonological deficit hypothesis.

How did that idea come about between…it would have been you and Isabelle, I guess, that worked on that idea?
DPS: Well, I think it came out of discussions with… between really the four of us, Isabelle and Al and me and Ignatius.
CAF: And Ignatius, uh huh
DPS: And … I can't remember any particular occasion that…
CAF: But it would have had something to do with the kind of…I guess Al did not have the idea of the module then, but he certainly thought there was a specialization for speech perception. And so the processing of speech is pretty much outside of awareness for…from his theoretical point of view, or from anyone's theoretical point of view I would think. And so I would think that the idea would kind of come from that. That what do you need to appreciate the alphabetic principle? You have to be aware of these segments that just get automatically processed in your brain by this specialization…so they're not available.
DPS: Well, we began to wonder: Well, when do children have some sort of sense of this? Of course we could have well asked when does anybody have some sort of sense of this. But we sort of thought about it in developmental terms originally.
CAF: Right.
DPS: And Isabelle, I think, made a project of looking for evidence and not finding very much out there that was relevant. So I think that's perhaps the… was the impetus for the first experiments that we did.
CAF: Right. And it really turned out to be important, because it turned out that kids don't spontaneously develop phonemic awareness and yet developing it is really important to being able to learn to read successfully. So it turned out to be kind of a seminal idea, I'd say, coming out of, I guess coming out of Haskins.
DPS: I think it did come out of [Haskins].I mean, there were others like Harris Savin who , I think, was…had done some experiments with young children that suggested that they weren't able to externalize segments. But I can't remember right now the details of those experiments.
CAF: And how…and then Charles Read looked at children's invented spellings as a way of trying to understand how they thought about the spoken language. Did that post date the Haskins work on, or the UConn work on phonemic awareness. I remember a book of his published in 1970, but I don't know if that was the first of his work on that subject. [This? Read, C. (1975). Children's categorization of speech sounds in English . Urbana, IL:National Council of Teachers of English.]
23:03
DPS: I can't remember when we met…when we became aware of his work or met him
CAF: Yeah. Butf course his kids were kids who knew the letter names.
DPS: Yeah.
CAF: They weren't entirely sort of naïve to reading, but they were mostly naïve to it.. OK. But that.. To me that's one of the important discoveries that came out of the developmental work at Haskins Laboratories. That really turned out to be something that mattered to how kids can learn to read. So it's something that Haskins researchers and UConn researchers can be proud of…the ownership of.
DPS: There was another angle that…In 1968, I guess shortly after… or 1969…68 or

69 shortly after I came here, there was an NIH sponsored conference that Al Liberman and Jim Jenkins were conveners of. And this happened at a conference center outside of Baltimore, Maryland. And I went down and gave a paper that talked about comparison of speech errors and reading errors.
CAF: Oh!
CAF: Well, it's in that volume…
CAF: I'm trying to think which one that would be. It wouldn't be the 1972 one?
DPS: Yeah.
CAF: So Kavanagh was involved in that? Jim Kavanagh?
DPS: Ignatius and…Mattingly and Jim Kavanagh were editors of that. And that was quite an interesting conference. And I'm getting around to why it was so interesting to me. Because there I met Harry Levin and Jackie Gibson.
CAF: Oh, yeah. Now when did their book come out?
DPS: A couple of years later, I think.. And George Miller was at that conference and gave a brilliant summary.
CAF: Of course.
DPS: And Ed Klima was at that conference. I met him. He gave one of the most memorable papers.
CAF: Now, wait. Was that the book in which he has a paper on the optimal writing system?
DPS: Right.
CAF: That's such a smart paper, so brilliant.
DPS: SO this conference for me was a motivating event, hugely motivating event. But the person who made the biggest impression on me of all these was Ruben Conrad…
CAF: Oh! *Ruben* Conrad?
DPS: …who was an English psychologist from the Applied Psychology Research Unit in Cambridge.
CAF: Who was doing the work on memory errors , was it?
DPS: He was interested in how the deaf compensated for their deafness in …and basically the message came through was that they *couldn't* when it came to written language.
CAF: But this was what motivated you to work with Isabelle on…I contributed to this, and I'm not remembering it very well, but it had to do with errors. Whether, if you had to remember a sequence like BDGT was that harder than BAXM or something that didn't rhyme.
DPS: That's right. It was harder because the code, the phonological code in short term memory which ordinarily aids you, in that particular situation where the materials are saturated with rhyme, it hurts.
CAF: And Conrad's finding was it didn't hurt the deaf as much as it hurt the hearing. Was that it?
DPS: Well, he had two findings. One is that they were terrible at short term memory. And the other was that the difference between rhyming and nonrhyming was not present.
CAF: And presumably for the… the two things were for the same reason. You need a phonological short term memory to retain that stuff.
27:36

DPS: And so that, I think, was the start of the experiments that we did and that you referred to.
CAF: Yeah, I didn't realize that his name was Ruben. He was J. R., wasn't he? J. R. Conrad? [No, he published as R. Conrad]
DPS: Yeah, but he was ref…
CAF: went by Ruben
DPS: Actually he belonged to the generation of English who considered the first name private property. So only the people who knew him were allowed to use it.
CAF: So you don't even know what the J stood for. I see.
DPS: But that was a defining event for me, and it was the most exciting conference that I think I've ever attended.
CAF: That's great.
DPS: And it happened at a very important, early stage in my career.
CAF: So you said it was probably in 1969, so it was shortly after you came here.
DPS: I believe it was the spring of '69.
CAF: Right. And you were still working with Michael on dichotic listening. But also had had this interest in dyslexia and things from your time in England.
DPS: I had presented some data on that, I think, at this conference, on…with good and poor readers.
CAF: mmhmm
DPS: I'm not sure I did. I can't remember. But anyway, the paper was called Misreading;
CAF: A search or errors
DPS: A search for explanation or something like that [Misreading: A search for causes]
CAF: Yeah, it wasn't errors, a search for something.
DPS: I remember there were confusion matrices for errors.
CAF: Uh huh. Yeah, yeah
DPS: I had learned to make confusion matrices from Kathy Harris earlier when we were beginning to study aphasia.
CAF: No kidding. Aphasia, right. Right. Ok. Um alright. So where did the phonological deficit hypothesis …how did it emerge?
DPS: Well I think it emerged partly from this interaction with Conrad.
CAF: Uh huh.
DPS: Because it was a short step from the deficits of the deaf, or the hearing impaired …is a way to put it…
CAF: I see.
DPS: …to the possible the deficits of dyslexics.
CAF: mmhmm
DPS: I mean, we were more interested in the beginning in, not in the…in severe reading disability.
CAF: Right.
DPS: And, we sort of culled subjects that met criteria of severity.
CAF: Uh huh.
DPS: Later, again with…because Isabelle was in education, and she was involved in the teaching of reading and stuff, later we became more concerned with looking at

the whole spectrum of reading ability.
CAF: Right Yeah. So the idea was that, whereas some people thought dyslexia was some kind of visual impairment and that's why they were struck by reversal errors when they occurred, yet you were more convinced that it was a linguistic deficit, a language deficit.
DPS: That's right, and we completely failed to find evidence that reversals were…
CAF: were special to…
DPS: were special. So I think that our earliest contributions were in the way of ruling out causes rather than finding them. And then…
CAF: Right. But then the phonological deficit hypothesis was a positive…step
DPS: Was a positive step, but it didn't come right a…from our earliest collaborations. It took a few years.
CAF: Ok And so evidence favoring that…I don't remember the terminology from my earliest years at UConn, the name phonological deficit hypothesis. Do you know how that came about? I could be wrong, but…
DPS: No I don't. I mean it's a good question, but I really don't know.
CAF: You'd think we'd find the answer in the book we just edited.
DPS: Yeah. we found the answer to one of our questions we had about the phonological depth hypothesis.
CAF: Uh huh, right.
DPS: We finally found the answer to that.
CAF: Yup, yup. So one source of evidence was that nice finding that you had from those short term memory experiments. That there was a much bigger impact of rhyming names of letters on good readers than there was on poor readers. And…and how did that hypothesis get developed after that?
DPS: Say that again.
CAF: So you mentioned that the kind of inspiration for that hypothesis probably came from that elaboration of Conrad's work , extending it to poor readers and finding as we did in a paper we published together that good readers showed a much bigger impact of letters being rhyming...having rhyming names than not having rhyming names, As you said, a nice finding: the good readers were worse at something than the poor readers in a sense.
DPS: Right
CAF: But then what happened after that? I mean I guess I sort of…that probably is the point at which I graduated and really moved onto speech and don't remember what happened after that.
33:01
DPS: Well one of the…, Bill Fischer was coming up for his defense about this time, and we turned our attention to spelling and spelling errors. And then Vicki Hanson came to the Lab and we began to look at spelling errors in hearing and hearing impaired people and later spelling errors in the profoundly deaf who were early signers.
CAF: Oh I don't even remember that work. What was the outcome of that?
DPS: Well, we found that it's possible, at least for the better educated profoundly deaf, to become pretty good spellers. We found that their… on a test of their spelling ability, where we used a cloze procedure, because we couldn't dictate words to the

deaf.
CAF: Yeah.
DPS: we found actually some overlap between the distribution of errors in normal hearing college students and Gallaudet-educated, deaf college students.
CAF: Now, but would the errors be of the same kind as hearing people? I'm thinking… I'm asking this because
DPS: No.
CAF: Vicki Hanson and I did a study of TOUCH… COUCH-TOUCH priming vs FENCE-HENCE priming and the deaf looked pretty much like the hearing as if they were phonological coders. Were you finding that with the spelling errors?
DPS: Well we found the difference between the deaf and hearing were not in the… so much in the numbers of errors but there were some in the kinds of errors. That the hearing students made very few spelling errors that were not…
CAF: phonologically plausible.
DPS: phonologically plausible, whereas the deaf would make some implausible errors. That was the essential difference.
CAF: Right, which makes sense. OK, and what was Bill Fischer's dissertation on?
DPS: Well, Bill Fischer looked at morphological factors in spelling as well as phonological.
CAF: Oh, he did? OK.
DPS : And I think it was partly under the guidance of Ignatius we came to appreciate that the spelling of English is morphophonologic not just phonologic.
CAF: Yeah, right. Did..But Bill's dissertation was developmental, was it on children's…?
DPS: No, it was on students [undergraduates].
CAF: Was it? I don't know why I don't remember that at all. I was pretty good friends with him.
DPS: And he was also involved a little bit later in collaborating with Vicki.
CAF: Was he?
DPS: But then I lost track of him.
CAF: Well, he went to, I think, Central Connecticut
DPS: Well, I know that, but he was there when he and Vicki and I worked together. But I didn't really see much of him and then I lost contact with him altogether.
CAF: Yeah, I think I found him a couple of years ago, living in Florida with Marla.
DPS: Uh huh. I remember, I wrote to him about the memorial service for Isabelle, but he didn't come. I don't remember whether I heard from him or not.
CAF: Yeah. Years ago, he came to Crown Street. And it might have been around the time Isabelle died. I just remember that he had gray hear, but otherwise looked exactly the same.
DPS: Uh huh.
CAF: OK.
DPS: So you lose a lot of people in the course of all of this kind of thing.
CAF: Well, he was so good, but. He was adamant that.. he'd say I want to go my own way and his own way meant, and I think Marla was part of the influence, that he just…he didn't really want to be a researcher. He just wanted to teach and have a life outside of teaching.

DPS: I think Marla was a big influence.
CAF: I think she was too. Yeah, yeah. So, but then, I'm trying to think of some other names. Bonnie Carter was one of the students who worked on the reading stuff.
DPS: Right. And she came to us from Ben Ginsburg. She was a behavior genetics student.
CAF: Oh really!
DPS: Right, and I think she went back…had a career in that.
CAF: Oh and then there was someone named Michele Werfelman, whose name I would not remember except I think I went to elementary school with her. And then she showed up in Isabelle's group, I think.
DPS: Yeah, she did one of the really interesting studies showing that good and poor readers could not be distinguished on memory for non…for abstract designs.
CAF: Oh, good for her! Right.
DPS: We used the Kimura figures in that study. But then she went off and..she was talented with computers. I think she went off to design educational software and never finished her degree.
CAF: Oh really! That's too bad.
DPS: Same thing happened to Linda Camp.
CAF: I only dimly remember her. I kind of remember her.
DPS: What happened to Linda. She was writing her thesis, she was…became a member of the jury of a notorious trial in Massachusetts where the State Treasurer was on trial for… in a corruption case. And the trial lasted for something like… for months and months. And she was empaneled all that time.
CAF: You mean she couldn't go home at night.
DPS: No!
CAF: She was in a hotel?
DPS: Right and she said her husband was not allowed to bring her her dissertation.
CAF: her dissertation. And she never finished after that?
DPS: Never finished.
CAF: Oh, that's depressing!
DPS: That surely is a unique excuse,
CAF: I know. It could be that she didn't want to anyway, but…that's terrible if that's really the reason she didn't finish. Well, anything more we should put on record about the phonological deficit hypothesis? One thing that just…,I saw a talk that I didn't go to recently about how someone thought that---maybe gave a talk at Haskins—that the phonological representations were fine, it was a memory deficit? Do you know what I'm talking about?
DPS: Yes. Yeah, well, I think that's an important question that…And our own.. This person, I think, tried to stick us with one side of that issue. Tried to…
CAF: As if you had had the view that it was
DPS: As if we had implicated the representations. Whereas in fact we've been rather…
CAF: agnostic about why
DPS: agnostic about the issue. And it's true that Anne Fowler was committed to the idea that representations were deficient.
CAF: Yeah, think, I don't know if you agree with me, but I think that she had a view

that was different from Isabelle about lack of phonemic awareness. I mean, I thought she thought that it's because the kids don't have phonemes in the representations and can't possibly become aware of them because they don't have them.
DPS: Yeah, she was impressed with speech error simplifications and scrambles that come out, she claimed came out of kids who were destined to become very poor readers.
CAF: Right, yeah.
DPS: My impression is still that's a special group and not generally true of kids with….
CAF: Right. Now this person who held the view that phonological representations are fine and memory is not, did he or she have evidence really implicating one or the other?
DPS: Yes. Yes, but I'd have to think about it to reconstruct it.
CAF: OK. So the state of the art, you think, is still pretty much that we know they don't deal with phonological representations very well, but we haven't really pinpointed the source of it.
DPS: I think that the phonological deficit hypothesis has held up very well
CAF: Yeah
DPS: But there is still a question of how it arises and exactly what it implies.
CAF: What the nature of the deficit is.
DPS: What the nature of the deficit is…it still is somewhat of an open question.
CAF: Alright, anything else we should cover?
DPS: I'm sure things will occur to me lter in the day or tomorrow. That's the way my mind works now.