Psychology of Bilingualism and Multilingualism
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Hello and welcome to the course Introduction to The Psychology of Bilingualism and Multilingualism. I am Dr. Ark Verma from the Department of Cognitive Sciences at IIT Kanpur. In this week I am talking to you about the relationship of bilingualism and multilingualism with other cognitive functions. In the last couple of lectures we talked about the relationship of bilingualism and multilingualism with different aspects of thought. In today's lecture I want to talk about the relationship of bilingualism and multilingualism with intelligence.

Now so far we basically reviewed studies from the perspective of linguistic relativity wherein the focus was actually to investigate whether the peculiarities of languages known by a bilingual might actually influence their perceptual and thought processes about the world. However there has also been a range of studies that have focused mainly on the effects of bilingualism on general cognitive abilities such as intelligence, memory, aspects of executive control, emotion and so on. In the next set of lectures I will actually focus on these aspects of the relationship between bilingualism and cognition. Now studies actually looking to investigate the effects of bilingualism on general cognitive abilities do not necessarily need to have a very sophisticated understanding of the structure of languages involved.

Rather they seek to investigate the user of the languages and you know for the presence and absence or of enhancement or detriment say for example in these specific abilities as a consequence of their bilingualism. You could say that somebody in your neighborhood is very smart because they know four or five or six different languages or you could say that maybe because that person speaks two or three languages that is where they are not very good in any of the languages they know. Also people have always been curious about whether knowing more more than one language makes you more intelligent, less intelligent, makes you you know communicatively more effective, not so effective and so many different things. In this lecture is sort of starting to sort of look at this debate and see whether bilingualism actually has any measurable impact on any of these general cognitive functions that we're talking about. Typically when you're looking at studies that want to do this they are actually trying to compare a group of bilinguals with a carefully matched group of monolinguals on factors such as age, socio-economic status, education etc etc, parents you know education and so on in terms of and then basically

compare the performance in terms of a well chosen task that would reveal a latent variable.

See for example if you want to check somebody's concentration, if you want to check some how somebody's problem-solving capabilities, if you want to check somebody's you know abilities in terms of managing responses, selecting correct responses and so on. So typically what people have been doing or people would do is that they would basically select a group of bilinguals and they would select a group of matched monolinguals which are not different in age, gender, socio-economic status and so many of these things and then actually the only difference between these two groups will be that one of these groups is a bilingual and the other is a monolingual and then both of these groups perform on a task and you basically compare okay any differences in their performances in the task actually can be zeroed in on the bilingualism of these different part on these participants. So here if you sort of you know want to go ahead in this direction, task selection is actually of very special importance because the same must be chosen on the basis of an informed hypothesis. You will not randomly pick a task, so there are many experimental tasks, people who are students of cognitive science or cognitive psychology would know that there are plenty of experimental tasks that are going around and if you want to choose one of these tasks to compare the differences between bilinguals and monolinguals you should have some kind of an informed intuition or an informed hypothesis about how bilinguals or monolinguals would perform on these tasks and whether and what kind of differences there are to expect between these two, between the performances of bilinguals and monolinguals on these tasks. Say for example you could take a test of vocabulary and you would actually expect it because monolinguals are exposed to only one language but probably they are exposed to this one language in great detail they would have a much better vocabulary of this particular language whereas because bilinguals are exposed to two or three languages and they are probably because of you know just a distribution of time and this is just a distribution of the amount of time they use these languages they might not have as big a vocabulary in each of these languages as the monolingual speakers would have.

So you can have any kind of question and you based on that question you will select your task and then you will compare the performance of bilinguals and monolinguals. More recently what has also been happening is that people have been basically just picking up bilinguals, a range of bilinguals and basically comparing the performance of different types of bilinguals or you know on different types of bilinguals by virtue of their degree of proficiency in the second language, age of acquisition of second language, early or simultaneous bilingual. We have talked about all of these differences so far. You can actually compare within bilinguals also how they perform on a given task and if you have an informed hypothesis it would tell you basically that okay what

kind of difference to expect and later how would you try to explain these differences. Let's take an example as I was saying researchers could hypothesize that due to a vaster conceptual world of bilinguals as compared to monolinguals they would possess a relatively higher skill in divergent thinking because bilinguals are exposed to you know concepts from two different languages maybe sometimes three or four different languages they would probably be able to think divergently more as compared to monolinguals or the hypothesis that you know because of their practice with managing their two co-activated languages bilinguals may possess superior abilities of cognitive control as compared to monolinguals.

So you can have any of these hypotheses you can choose a task which is testing for these specific abilities and then you could compare the performance of bilinguals and monolinguals on these you know tasks. Now interestingly given the structure of the two languages of a bilingual is not really a concern here the bilinguals knowing any pair of languages could be actually be recruited in these experiments although the effects of on of these tasks and cognition may actually vary depending upon you know typological differences between the two known languages of a bilingual for instance the ability of divergent thinking in bilinguals may be more if the bilinguals have learned two distant languages say for example a Hindi English bilingual may be known to have or a bit more ability in terms of divergent thinking as compared to you know a Dutch English bilingual or a Spanish Catalan bilingual for that matter the same may apply for any kind of ability that you are actually intending to test. Additionally to sort of ensure that the participants are actually well matched the experimenters collected information about a number of background variables such as you know the children's and their parents' attitudes toward learning French or English in their academic performance in school their ages gender socioeconomic status degree of education and so many other things. Now the authors initially had hypothesized based on the contemporary literature that had been you know collecting so far that bilingualism would actually be detrimental to their performance in these tasks of intelligence however in contrast to their expectations the bilingual children actually outperformed significantly the monolingual children on the majority of tests and subtests both in verbal and nonverbal intelligence. More precisely the bilingual children were found to be better in concept formation in and in tasks that required mental flexibility and also they showed a more diversified set of mental abilities than the monolingual control children.

Interestingly these results were actually very robust and stable and did not change when the differences between the two groups who are matched specifically for socioeconomic class age gender etc and again these results did come as a surprise for the investigators as they were rather contrary to the contemporary literature and consequent intuitions. However the authors later observed that some of the earlier studies which had not found

these differences may have lacked some degree of experimental rigor and had not really controlled for various variables such as age, gender, socioeconomic status, amount of education etc which may have been the reason why they were not finding these differences so far. However it is also discussed that some of the early studies were not really standardized and sometimes the bilingual children were tested in their weaker language and hence leading to you know lower scores on lower scores on these tests. Say for example if you are you know testing early you know testing a bilingual who's just picking up his second language say for example somebody who's just learning English and has only spoken or performed in Hindi for let's say till their high school or their senior secondary. Now if you start testing these people directly in English and they have little or less knowledge of English obviously they will score less in these tests because these tests are in English and you see that you know in our country also a lot of exams are actually provide bilingual alternatives so that we can actually handle the confound of language as a barrier to their overall intelligence.

Now while research has actually reason about the reasons for earlier studies not finding any beneficial effects on bilingualism some actually wondered about the unique points of this study by Peal and Lambert and why this study would have been able to find the differences between bilinguals and monolinguals. One of the things that was noted that it would be that the Montreal region of Canada where the participants in the study were actually selected from both English and French were socially highly valued and they were respected languages and therefore the acquisition of English by French speaking children of this region was not really seen as a threat on their learning French and basically it was no social pressure was not there to pick up this language so in a sense these children were happily learning you know English and they were not really threatened by it or there was no social pressure to learn or to not learn English. So in fact learning English did not really put them into danger of losing their French and rather added to their linguistic repertoire with a new language and with you know with exposure to a new conceptual world at the same time. So this basically can be referred to as a form of bilingualism that adds to a bilinguals overall linguistic repertoire and the existing language does not suffer a cost at all. This was referred to as additive bilingualism by Peal and Lambert.

Now an opposite scenario is also possible an opposite scenario could have been that could have been referred to as subtractive bilingualism wherein basically the bilingual would feel forced to put aside their own native language or subtract from their knowledge of the ethnic languages for a more prestigious and you know necessary national language. Say for example if they were forced to learn English and leave out French it would sort of harm them in and their general cognitive functioning. Here the new learned L2 could be generally you know gradually expected to replace the L1 which would

weaken the native language and therefore have detrimental effects for general cognitive functioning as neither the two languages would become you would now be seen as a natural tool for the expression of thought and you know and you know any kinds of their feelings. Now this is very similar to you know what you can see is is being talked about in the country now that we are trying to give chance to people to learn in their native languages. It is very important for individuals to learn in their native language so that they can grasp better they can understand better and there is no burden of learning English before they you know can grasp more sophisticated concepts.

Finally the authors also reason that the children in Peal and Lambert study actually performed better than monolinguals because they you know had this you do they actually could utilize the opportunities available to them for becoming these additive bilinguals. Now alternatively another possible reason for Peal and Lambert's findings could also be that the relationship between bilingualism and intelligence would be the other way around. Now some researchers actually wondered that maybe it is not that bilingualism is helping these children become more intelligent it is because they are already intelligent they are being able to become bilingual and utilize the opportunities of learning the two languages and because they are already intelligent they would anyway score better on the tests of you know intelligence that they were tested upon. Now this is an interesting proposal but actually the best way to do this or to determine the causality of the relationship between bilingualism and intelligence one would actually need to design a study maybe a longitudinal study where two match groups where in one group you would actually have the experimental treatment let's say give the opportunity to these kids to become bilingual and in the other this opportunity would not be present. On all other respects these two groups should be completely matched and actually there was a bunch of longitudinal studies that actually suggest that bilingualism did improve general cognitive function functioning to a certain extent.

Let's look at a study like that. For instance Scott in 1973 compared two groups of English Canadian children at the start of the study the children from one group which was the experimental group were actually given the opportunity to become bilingual through immersion schooling in French over a couple of years whereas children from the other group which is the control group were actually not given this opportunity and was schooled exclusively in English. Now the children from both these groups were actually matched on IQ and other socioeconomic status in the beginning of the study already. In another study a random selection of schools in an area of New Guinea which is a French-speaking local in America were permitted to offer part of their elementary curriculum in French which was the children's home language and another group of schools with children of similar intelligence and socioeconomic background was actually you know not allowed to do this and they offered an all English curriculum so you can see one

group of schools is allowing the bilingual exposure to these kids whereas the other group of school is not allowing bilingual exposure to these kids and both groups are actually matched. Now when children in these two studies were tested after a gap of few years children from both these studies actually outperformed the other monoliminal group that you know on test they tested for the aspects of cognitive functioning such as math or a divergent thinking so you can see that in some sense bilingualism all things considered is actually helping these kids become better.

Finally in a third longitudinal study which was conducted by Kessler and Quinn in 1980 a group of Hispanic American English children Hispanic American children were provided with the opportunity to learn subject matter in their home language and which was Spanish and their performance on a number of tasks was actually compared to that of a socio-economically more privileged group of middle-class monolingual English-speaking white children. Now interestingly both groups of children were given extensive training program in science inquiry through discussions films and hypothesis testing. Now not surprisingly as we've been seeing in the study so far the students from the Hispanic American group actually outperformed those in the English American group in problem-solving capabilities generating hypotheses of a higher complexity and even generating those you know hypotheses in better quality of linguistic structure than their English counterparts. If you look at you know all of these studies in totality you would realize that these results actually suggest that bilingualism does have some positive impact on cognitive functioning and that it is useful to allow ethnic minority children to nurture their home language and thus to convert their experiences from subtractive bilingualism into adaptive bilingualism. Now interestingly while we've been talking about the benefits of bilingualism we have been talking about how it can help people's intelligence and so on there are also a range of studies that have you know we have pointed out certain drawbacks in being bilingual for instance researchers have actually shown that as compared to monolingual norms bilingual children actually have relatively smaller vocabularies in their separate languages.

It's probably because as bilinguals have two fully developed lexicons the you know and two words for the same concept each single words gets used much less often than a single word that a monolingual uses and therefore is susceptible to loss and forgetting and you know overall being lower in the frequency. Now this is also one of the reasons that you know word retrieval is in fact slower and more effortful in bilinguals compared to monolinguals so this also sort of supports this notion that yes bilinguals typically will have lower vocabulary in each of their two languages as opposed to monolingual speakers of both their languages. Interestingly bilingualism has also been linked to advantages in metalinguistic awareness for example the ability to reflect on and manipulate the structural features of language independent of meaning. Now

metalinguistic awareness is basically where you're not really just caught in the meanings of individual words but whatever overall sense you're getting and researchers have actually suggested that metalinguistic awareness is actually increased in bilinguals because of the dual linguistic environment you know that they are having exposure to two very different sometimes very diagonally opposite conceptual words which actually enables them to appreciate or pay special attention to the structural aspects of both their languages. In other words because they have two fully developed linguistic system it affords them a chance to analyze and compare the two and hence gain more insights about both of these linguistic systems.

Now for instance one of the you know examples of the set metalinguistic awareness has actually been the observation that bilinguals have greater word awareness than monolinguals and have the knowledge of the words form and meaning and have the knowledge that words form and meaning are not actually entirely inseparable entities they know they sort of already get the sense that these two things are arbitrarily related. How would this happen say for example I am a Hindi English bilingual I know that there is a word seb for this particular fruit and there's a word apple for this particular fruit I would know that both seb and apple do not have anything to do with the fruit itself they are just two different ways of calling out this particular concept and this realization would make me sort of ponder about you know how you know these two words are related to the object and what are the different meanings that can be implied and so on this works even better when you're talking about more abstract entities rather than concrete nouns. Now in order to generate or gain empirical support for these observations from Leopold, Ianco Worrall actually hypothesized that the early separation of word sound and word meaning might actually cause a degree of accelerated semantic development in bilingual children as compared to monolingual children. Now the underlying assumption here was that attention to form aspects is a developmentally earlier stage than attention to meaning aspects and bilingual children would actually be able to do this much earlier than monolingual children because for them there is you know these two things are much more tightly knitted. Now Ianco Worrall tested for these hypotheses while in a semantic phonetic preference test in which Africans English and monolingual English and Africans children so again there are three groups but actually presented with a set of standard words each accompanied by two choice words.

One of the latter two words were similar you know in sound to the standard say for example cap and can are very similar in sound and the other was semantically related to the standard word say for example cap and hat. Now cap and hat are semantically related whereas cap and can are phonetically related. Now the participants in this study were actually asked to select the choice word most similar to the standard so you can basically they were asked questions like I have three words cap can and hat which is more like cap

can or hat now if the if the children are actually going for semantic relatedness they would actually go by cap and hat and if they are actually going just by the cosmetic property of phonology they would probably say cap and can are more similar to each other. All of these participants were children young children aged between four and six and seven to nine years and they were tested in both their languages and their performance in Africans and English was compared to the performance of that of you know African English bilinguals respectively. Now in this for this as far as results are concerned the authors actually predicted that the older children would select the semantically related alternative much more often than the younger children and that within each group bilingual children would select the semantically related alternative much more often than the monolingual controls.

Indeed the results actually showed that semantic preference did increase with age so basically we are seeing that with age children are getting this you know awareness of semantics and conceptual relatedness between objects but this age function actually was there only in monolinguals. In bilinguals they did not see this age function because the bilinguals had actually achieved this stage much earlier in life so with change say for example between four to six years and seven to nine years there was no difference in age because both of these groups are already performing at a ceiling which tells us again in turn that bilinguals are indeed better in their metalinguistic awareness as compared to their monolingual counterparts.

Moving on in another experiment the authors actually gathered evidence that the accelerated semantic development of the bilinguals was related to their early awareness of the relationship between word form and word reference is arbitrary. Now here in children were asked three types of questions we are still talking about the young overall studies in just another follow-up experiment that they are doing in this study they are actually asking three types of questions say for example why is the dog called a dog and these questions called for the judgment of whether or not the word names could be interchanged say for example could you call a dog cow and a cow dog and questions that call for interchange of word names in place say for example let us play a game let us call a dog cow now does this cow have horns does this cow give milk now if you see that if the children will have this awareness of the fact that the animal and the name cow or the animal in the name dog attached to it are actually different things and they are not really related the cow word does not have anything to do with the cow and the dog word does not have anything to do with the dog animal then they would very easily be able to change these things say for example if they are if they are asked to exchange the names they would still be able to do that while appreciating at the same time that even if you call the cow dog it would still have horns it will still give milk and if you call the dog cow it would still bark now this is something sort of you know interesting and it basically explicitly tests the children on their knowledge of whether these relationships

are arbitrary or not and again just to sort of remind you the realization that this relationship is arbitrary would come much more naturally and earlier to bilinguals because they have two systems two words to map on a single concept as compared to monolinguals who had one concept mapped onto one word and would think that this relationship is rather intricate now in this experiment again the bilingual children outperform the monolingual controls on the second type of questions you know when when you were asking to interchange them and the performance of both groups of the questions of the remaining types was rather similar now now in the backdrop of what we have been discussing if you look at this based on the differential result of bilinguals on the second type of questions the authors actually concluded and made sense that bilingual children are actually aware of the arbitrary relationship between a word and its meaning at a much younger age than a monolingual child. So it tells us that you know this metalinguistic awareness is also benefited or is something that the bilingual children are sort of you know endowed with or they grasp it at a very early age which may augur very well for other kinds of cognitive functions which these bilingual kids would actually engage in this is all that I wanted to talk to you about in today's lecture and I will see you on the other side with a different lecture thank you you