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Culture, Language and Thought: Field Studies on Colour Concepts

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Abstract

In a series of studies the assumption of a lack of colour concepts in indigenous societies, as proposed by Berlin and Kay and others, was examined. The research took place in the form of minimally invasive field encounters with indigenous subjects in South East Asia and in India, as well as in West, Central, and South Africa. Subjects were screened for colour blindness using the Ishihara and Pflüger-Trident tests. Standardised colour tablets had to be designated in the indigenous languages; these terms were later translated by native speakers of the indigenous languages into a European language. The indigenous subjects were able to name the colours presented. Indigenous vs. globalised cultural factors were reflected in the use of reference objects for naming colours. Both metonymical and non-metonymical indigenous colour names did not follow a stage pattern as Berlin and Kay and others have proposed. The high precision of indigenous colour names corresponds both to the precision of experts' colour names in the industrial culture, and to the highly precise grammar that characterises indigenous languages. It is concluded that cognitive categorisation of visual perception takes place regardless of the cultural context, and that former misunderstandings resulted from inappropriate methodological designs.

Keywords

colour concepts – cognition – culture – field research – indigenous – linguistic relativity

1 Theoretical Background

A central issue of cultural psychology is the general impact of culture on cognition. This is often discussed with a focus on language, which then serves as a paradigm for culture at large. According to the principle of linguistic relativity, also known as the Sapir-Whorf Hypothesis (Lehmann (1998) describes the attribution of the linguistic relativity principle to Sapir and to Whorf as a myth, substantiating that especially Whorf never shared some of that principle's core positions), thinking is influenced by one's language. Therefore, individuals with different cultural backgrounds should also exhibit different ways of cognitively structuring their respective internal representations of the world.

1.1 *Studies on Colour Concepts*

When the principle of linguistic relativity is applied in its extreme form, then a person could not think anything that he or she could not express by language. There has been a large number of studies involving colour, again as a paradigm, for testing that principle; Eric Lenneberg (e.g., Brown and Lenneberg, 1954) can certainly be considered a protagonist of this research line. A typical procedure in those studies was as such:

A selection of colour chips was shown to subjects of a particular culture. Then, these chips were taken away and, after a while, presented again amongst a larger number of different colour chips. The subjects were then asked to identify the chips that they had seen before.

The idea behind the procedure was that if the persons had no name for certain colours, then they also could not think about those colours, and consequently could neither remember nor identify them.

But what made these researchers assume that persons of the cultures investigated lacked words for colours? This conception was planted by Berlin and Kay (1969), who claimed that "Basic Color Terms" came to exist in cultures in an evolutionary way. Kay and McDaniel (1978) presented a method of discerning basic from non-basic colour terms; however, an empirical test of this method by Mervis and Roth (1981) failed. Likewise, results presented by Robertson et al. (2000) shed doubt on the focal vs. non-focal colour distinction. In quite a colonial manner, indigenous languages were depicted as being so primitive that they did not even have words for colours, and that only by and by, with cultures becoming more developed, did colour terms come into being. Thus, the

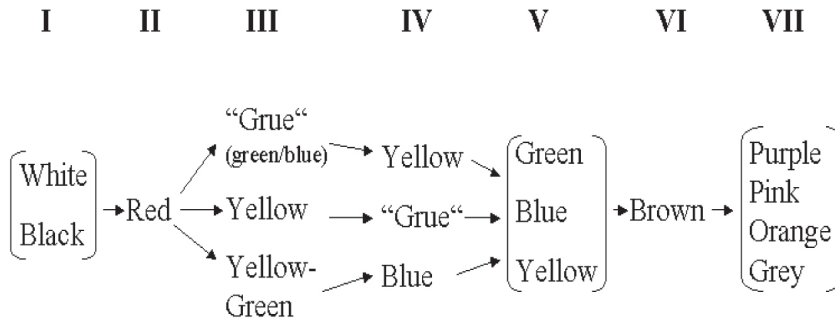


FIGURE 1 *The proposed "Stages" (cf., Kay, 1975).*

extent to which colour terms existed would be a marker for the degree of development of a culture. Berlin and Kay (1969) proposed a number of stages for cultures and their languages (Figure 1), with the most primitive ones being at Stage I and English being at Stage VII, that is, according to these authors, at the highest level. At Stage I, only the terms for Black and White existed, as genuine colour words.

It should be mentioned that in the studies that had been carried out to test the linguistic relativity principle under this proposition even the indigenous subjects, who had been characterised as being at Stage I, in fact did recognise the colour chips that previously had been shown to them, when the chips were presented again among a greater number of other chips (e.g., Heider and Olivier, 1972). In the discussions pertaining to these findings, they were at best regarded as evidence against the principle of linguistic relativity. Within that academic discourse, there were some basic problems, beginning with the adherence to the concept put forth by Berlin and Kay (1969), despite early critique by Durbin (1972). An extensive overview of problems, especially with regard to methodology, has been given by Lehmann (1998). In reaction to the critique, though, only some minor modifications of the model were made (e.g., Kay, 1975; Kay and McDaniel, 1978); the general idea of colour terms gradually – and somewhat mythically – appearing in “stages” was not given up.

Hardin and Maffi (1997) point out two problems:

Berlin and Kay interpreted this as an evolutionary sequence. Their claim was controversial for two reasons. First, because, if it were correct, this would be one of the few instances in which linguistic development proceeds unidirectionally from simplicity to complexity. Second, because it readily suggested to some the now-taboo late-nineteenth-century picture

of an evolutionary culture chain, with Papua New Guineans at the bottom, scarcely a step above the beasts, and sophisticated Europeans situated comfortably and properly at the top. (Hardin and Maffi, 1997:5)

1.2 *Culture and Language*

Before we turn to our studies and then look for alternative views, it is necessary that we digress in order to clarify some interdependencies of culture and language. There is general consent that indigenous and archaic languages typically are characterised by highly complex grammar, entailing high precision of communication, whereas modern languages, in comparison to their predecessors, have a reduced grammatical complexity, accompanied by a larger dictionary (e.g., Liebi, 2003; Bodmer, 2004). From the perspective of system theory, one can say that the larger dictionary of modern languages compensates the reduced grammar, thus ensuring that communication functions.

The phenomenon of these contrasting types of languages – indigenous and archaic ones on the one hand, and modern ones on the other hand – can be explained by cultural syntheses out of which languages with new features evolve (Groh, 2011). When, in the course of history, cultures with their respective languages overlap and members of different cultural backgrounds interact, a communicational phenomenon occurs, which is labelled as “Foreigner Talk”, and which shares many commonalities with “Baby Talk” (Snow et al., 1981; Whyatt, 1994; den Besten et al., 1998; Csehó, 2009). In both cases, simplifications take place, which enhance the ratio of effort input and effective output. In cultures that result from the synthesis of predecessor cultures, and that feature a language yielded by that synthesis, grammatical complexity is reduced in comparison to the former languages. Those cultures that have emerged from cultural synthesis can again go into synthesis with each other, etc. An example of a language resulting from many precursory cultural syntheses is English. Whereas in other European languages, distinctions between several grammatical cases still exist, they have been abolished in English, with the exception of the genitive. As flexions have been lost, definite and indefinite articles are not inflected any more, thus having been reduced to one or two (the, a/an), suffixes have largely been lost (except for s, which has proven to be quite stable, persisting in the genitive and in the plural of nouns, as well as in the third person singular of verbs). At the same time, English has the largest dictionary of all languages. A contrasting example would be Ancient Greek, which besides flexions had not only an active and a passive voice, but also a medium as a third category, with the verb being both active and passive.

As we can see, linguistic simplification is a central phenomenon within the processes of cultural syntheses. We shall later discuss implications of this

aspect for culture-specific strategies in labelling cognitive entities with linguistic terms.

2 Investigations

A series of studies were carried out in South East Asia, West Africa, Central Africa, South Africa and India. The general method and procedures were as follows:

2.1 *Method*

Minimally invasive field encounter with indigenous subjects.

2.2 *Procedure*

1. Testing subjects for colour blindness.
2. Presenting standardised colour samples, asking subjects to name them.
3. Presenting these names to another person of the same mother tongue and having them translated into a European language.

2.3 *Study 1*

The first of a series of studies took place in a Dani village near the Baliem valley of West Papua. These persons and this particular indigenous setting were chosen, because of the studies carried out by Eleanor Heider (formerly Rosch, then Rosch Heider) in the same region with Dani subjects. Those studies were characterised by a firm belief in the concept of Berlin and Kay (1969). Clarification pertaining to the perception and processing of visual stimuli was nonetheless necessary. Unlike Heider's studies, one premise of our studies was the practical consideration that people who are able to see colours, and who live in a colourful world, could also be expected to be able to designate colours.

2.3.1 *Method*

The investigation was carried out as a minimally invasive field encounter in an indigenous setting. This method is in contrast to former approaches, which were very much burdened by the cultural dominance that the First World researchers exerted over the indigenous subjects. Those researchers' behaviour in many cases certainly was not what would generally be considered proper for guests. In those approaches, the bias of cultural dominance was used – or misused – as an opportunity to exert control over the dominated subjects. White scientists told the indigenous subjects what to do, without showing

them respect on a mutual basis. Sometimes the researchers had the subjects brought to the police station, where they were put into clothing, placed solitarily on a chair (even though the indigenous persons traditionally were not used either to wearing clothes, nor to sitting on chairs, nor to non-group-communication). The subjects were then told how to give reactions to the stimuli presented. Obviously, in this manner, these studies were able to be carried out more easily than would have been possible in a more culturally sensitive way, and they also fitted better into the scheme of First World studies.

Even if we leave ethical aspects aside and narrow our view to the methodological aspects, it is clear that without minimising the invasiveness, there are too many interfering factors and unknown variables that bear on the results; therefore, enhanced validity can be expected from minimising the invasiveness. Apart from the methodological argumentation, we now have international laws protecting indigenous rights, and no discussion is necessary in accepting that researchers, like anybody else, should respect these laws. According to the United Nations Declaration on the Rights of Indigenous Peoples (2007), any action which might have the effect of depriving indigenous peoples of their cultural values or ethnic identities should be avoided. When cultural dominance is exerted on indigenous persons, destabilising effects have to be expected.

Consequently, minimising cultural invasiveness not only meets ethical and legal requirements, but also leads to enhanced insight into the culture being visited. On the other hand, since some schematic procedures cannot be insisted upon, compromises need to be found during data collection.

We operationalised the minimising of cultural invasiveness by integration into the traditional behaviour patterns and by not imposing our norms of communication on the people visited. Rather, we accepted their ways of interacting and tried to fit into these ways as well as possible. In order not to destabilise indigenous identities, special attention was paid to the presentation of the self and to integrate ourselves on the level of visual communication. This meant reducing the covering of our bodies oriented towards the traditional covering norms of the culture visited. This was very much appreciated, and one of the elders came on the last day of our stay, shook our hands and said “wa” (thank you).

Local tour guides, who were of Dani background, accompanied us on the way to and from the village, and also stayed with us there. The chief guide, who was of Dani-Lani background, and who spoke both Dani and English, yodeled when we passed another village and before we reached our destination, explaining to us that someone who sneaked by quietly was considered to have bad intentions, because he apparently did not want to be noticed.

We finally arrived at some traditional huts near the river, south of Kurima, where about 45 Dani lived. Since we knew from earlier field-studies that singing is confidence-building, we sang some choir songs while sitting with them between the huts, with the effect that the Dani also sang some beautiful polyphonic songs.

2.3.2 Procedure and Subjects

As a screening for colour blindness, spot tests were taken with the Ishihara Tables 11 and 14, as well as with the Pflügerhaken trident test, because these checks work without alphanumeric material. This screening for colour blindness was done in a playful way. While we sat with the Dani on the ground near one of the cooking huts, we then took out the colour samples, showed them one by one, and each time asked what they would call that. The tour guide, who spoke both Dani and English, assisted us by explaining our questions to the local Dani. Occasionally, guides and locals switched to Bahasa Indonesia in their communication. At that time, about one third of that village's population was at that spot. However, people came and went, and 5–6 Dani men, around 30 years old, participated in the investigation. There is a general tendency to strive for consent, and unhinging individuals from the collective would have been culturally invasive. After some collective discussion, we were then informed about the Dani term to designate the particular colour.

The answers given were written down and also, as a precaution, recorded with a little Sony dictation machine, which, by the way, did not attract remarkable interest from the Dani. After returning to Wamena, the answers given were presented to another native Dani, approximately 25 years of age. Without being told that these words were given as names for colours, he was asked for their meanings. By this method, we tried to avoid expectation effects and to achieve a high validity for an unbiased understanding of the terms used.

2.3.3 Stimuli

We presented standardised HKS-K colours (Table 1). The colours presented were the following foils of an HKS-K foil fan (HKS-K Entwurfsfächer, H. Schmincke, Erkrath, Germany) in the order shown in Table 1:

White is unnumbered, since it is represented by the back cover of the fan. The stimuli were presented in open daylight. It has to be noted that both the lens and the vitreous bulb of the human eye continually develop a yellow stain over time. The lenses of a newborn, 20, 40, 60-year-old etc., can be compared to sunglasses with increasingly yellow shades, serving a natural protection

TABLE 1 *HKS-K Colours*

Colour	HKS-K No.
Yellow	3
Red	14
Blue	43
Green	65
Orange	7
Brown	82
Black	88
White	(fan board, unnumbered)
Purple	34
Turquoise	53

against ultraviolet light. However, knowledge of this phenomenon makes exact specification of wavelengths, both of the actual skylight and of the stimuli's albedo, obsolete.

2.3.4 Results

Of the ten stimuli presented, all were named by the Dani (Table 2). Turquoise was subsumised under green, as could also happen with speakers of English or another European language. If we follow that categorisation, we can say that seven out of the nine colour designations are object colour names. Two of them apparently were proper colour terms, since the Dani translator did not supply us with an English word. It could even be claimed that three of the Dani designations were proper colour words, as Howaken is the paint used for net-bags.

The findings contradict Brown and Lenneberg (1954), Berlin and Kay (1969), Heider (1971, 1972) and Heider and Olivier (1972), who all assumed that the Dani were on the lowest of the proposed "stages", having only the words *Mola* and *Mili* for light and dark. However, even that is wrong. Anyone of European language speaking to a Dani who shares that European language with him or her can find that both words refer to colours. *Mola* means colourful in the sense of bright colours, whereas *Mili* identifies things which do not have bright colours, but rather colours of darker shades. These two words are as general as the English word "colourful", and have nothing to do with colour terms as such.

TABLE 2 *Results of Study I*

Colour	Dani name	Translation
Yellow	Howaken	(colour of) Net-bag
Red	Mep	Blood
Blue	Kumeleken	(whitish) Necklace
Green	Gareka	Fresh leaves
Orange	Saoroken	Little (darkish) net-bag
Brown	Loge	
Black	Muli	Little seeds inside a certain fruit
White	Gut	
Purple	Wiayuken	A certain fruit
Turquoise	Gareka	

The Dani do have a proper colour term for white, and they also have one for brown, which, according to the Berlin and Kay concept, they were not supposed to have. As the other denotations revealed, the Dani use the highly effective metonymical tagging technique of object colour names.

2.4 *Study II*

In West Africa, the investigations took place in Benin, Togo and Nigeria. The field research in the first two countries mentioned pertained to the Somba/Tamberma. This tribe has been divided by a border and now carries two names, Somba for the northern part, living in Benin, and Tamberma for the southern part, living in Togo. The border is open every Wednesday, so that coherence continues, as we also found in another investigation (Groh, 2008), and if Indigenous Rights become implemented (Declaration of the Rights of Indigenous Peoples, Article 36 (contacts despite international borders); United Nations, 2007), in-group relations should further be strengthened. The common language of the Somba/Tamberma is Ditamari, a tonal language, which is highly difficult to transform into a written system, at least when tackled on the basis of the European sound and sign system. The study with the Somba/Tamberma was carried out in both parts of the tribe and, analogue to Study I, as minimally invasive field encounters, with screenings for colour blindness and with the same set of HKS-K colours. The answers given were also recorded with a dictation machine. However, the next step in our methodology, having these data translated into a European language, has not been taken yet, which

is because no native speaker of this very rare language could be found outside the context visited to translate the recorded words into a European language.

Therefore, with regard to West Africa, we can only draw upon the data collected at the University of Ibadan, Nigeria. The study took place at the Dept. of Psychology with students in a lecture hall. A local colleague assisted in ascertaining the ethnic groups represented among the students with their respective languages, and with writing down the responses. Screening for colour blindness was carried out randomly before presenting the stimuli, which again consisted of the HKS-K set as above.

2.4.1 Results

For each HKS-K number, first the English colour name is listed in Table 3, and then the answers collected from the students of the respective cultural background. The lists are not complete in the sense of having an answer in every language present for every colour presented, as the students seemed a bit weary and were therefore not fully cooperative. The answers are shown as written down by the local colleague, with the original explanations, if given, in addition. Syntax, semantics and spelling were left unchanged.

TABLE 3 *Results of Study II*

Language	Colour Name
No. 3	
English	Yellow
Yoruba	Elezuru (Yam special)
Igbo	Onashara (Light White)
Tiv	Ngu-Er-Ka Kwau Ayaba
Ishan	Obhala – Light
Owan	Oyha – likening it to – fruit (Banana)
Isoko	Compare it with Banana/Orange
Urhobo	Oda Dibo – (Paint of banana)
Ijaw	Pinapina – (Just like White)
No. 14	
English	Red
Yoruba	Pupa
Igbo	Uhie (Has colour of blood)
Tiv	Nyian
Hausa	Ja

Language	Colour Name
Owan	Oume
Isoko	Ododo
Urhobo	Oda Obara – Has blood like
Ijaw	Kwekwe
No. 43	
English	Blue
Yoruba	Olomi Aro (Blue)
Igbo	Oji (Something dark in colour)
Tiv	Kwar Kwaodo (Like sky) Ngu-Er-Ka Kwav Aondo
Owan	Iblue (Sky)
Urhobo	Obiabi – Dark
Isoko	Uvie
Ijaw	Bilo
No. 64	
English	Green
Yoruba	Alawo Ewe (Colour of leaf)
Ibo	Akwukwo Ndu
Tiv	Ngu-Er-Ka Ikya Uwer Nahan
Owan	Ebesugbo – Leaf
Ijaw	Deibide (Like to a particular cloth)
Hausa	Igreen
No. 7	
English	Orange
Yoruba	Olomiosan (Like orange)
Igbo	Odo (Like orange)
Igara	Oromi (Orange)
Urhobo	(Like orange, any orange fruit)
No. 82	
English	Brown
Yoruba	Alawo Amo (Mud)
Igbo	Ajaja (Like sand/mud)
Urhobo	Orogho (Sand/mud)
Hausa	Ja (Like to red)
No. 88	
English	Black
Yoruba	Ondu
Igbo	Oji

TABLE 3 *Results of Study II (cont.)*

Language	Colour Name
Igara	Ovivi
Urhobo	Obiebi
Hausa	Beki
English	White
Yoruba	Funfun
Igbo	Ocha
Igara	Vunvun
Urhobo	Ofunafun
Hausa	Beri
No. 34	
English	Violet
Yoruba	Else Aluko (Colour of the feather of a particular bird)
No. 53	
English	Turquoise
Yoruba	Same as green
Igbo	Akwukwo Ndu (Live leaf)
Igara	Icono Avi – Colour leaf like green
Urhobo	Iconovie – Like green
Hausa	Colour of the leaf

Again we see the general capability of the various cultures to designate colours, and again, metonymical object colour names prevail, however, black and white are different. This also accounts for the Fulfulde language: *danedyum* (white); *baladyum* (black HKS-K 88); *y'am* (blood; red 14); *assora* (a fruit: blue 43 and purple 34; blue is also *damo dari*); *hako-hako* (*hako* means leaf; green 64 and turquois 53); *leddi-leddi* (*leddi* means earth; brown 82) etc. (also see Levinson (2001) for examples from a Papuan language of reduplication as a signifier for colour terms). However, there is a Fulfulde colour word *bodedyum* for a light brown with a touch of red, which is applied to mulatto persons.

On the one hand, one could claim that black and white are not really colours, but rather abstract concepts, one standing for darkness and the other for brightness, and that, instead of comparing colours to objects, something black or white, when presented, is then compared to those concepts. On the other hand, from a Berlin and Kay perspective, it could be claimed that these

colours appear on their proposed “Stage I”. However, the Ibo – who are the same as the Igbo – do not quite fit into the stage conception: Because they have a term for green, they are supposed to also have a “basic” colour term for red, which is not the case. Rather, red in Ibo/Igbo is labelled by a reference to blood.

2.5 Study III

Study III took place in a camp of the Bagyeli Pygmies in southern Cameroon, near the border of Equatorial Guinea. The investigation was affected by the practical problem that the HKS-K foil fan was not available any more. NCS colours in DIN-A7 format were chosen to replace them as shown in Table 4.

Procedures of data collection in the village were as in Study I. Approximately ten adults (seven men, three women) participated. Two French speaking Bantu tour guides translated and also gave the additional meanings of the Bagyeli’s words for the colours presented.

2.5.1 Results

Results (Table 5) are shown in the order that the colours had been presented. The additional meanings, here given in English, were originally recorded in French.

After the investigation, the Bagyeli presented a branch of the *tunær* bush. This specimen had a thin orange structure underneath the bark. Also, they presented a leaf of the *kung* plant, as well as a hose woven from it, in which manioc is stored and transported.

TABLE 4 HKS-K-NCS Equivalents

HKS-K No.	Closest NCS equivalent according to the Berlin branch of NCS
Yellow 3	S 05 80-Y
Red 14	S 05 80-Y 90 A
Blue 43	S 25 65-R 80 B
Green 65	S 20 70-G 20 Y
Orange 7	S 05 85-Y 50 R
Brown 82	S 35 60-Y 70 R
Purple 34	S 30 55-R 50 B
Turquoise 53	S 20 60-B 70 G
Black 88	S 90 00-N
White	S 03 00-N

TABLE 5 *Results of Study III*

English	Gyele	Additional meaning
Turquoise	<i>Pié</i>	Avocado tree
White	<i>Nabambala</i>	
Orange	<i>Mpulæ</i>	Particular tree
Green	<i>Kale kung</i>	Leaf of the <i>kung</i> plant
Brown	<i>Mbili</i>	Trunk of a particular tree
Red	<i>Liquô/matylie</i>	trunk of a particular tree/blood
Black	<i>Mbiliashye</i>	Charcoal
Blue	<i>Bavindi</i>	Particular tree with flowers
Yellow	<i>Mbambo/tuncær</i>	Fruit of a particular tree/particular bush
Purple	<i>Mpindi/duononi</i>	Particular animal/particular bird

The only non-metonymical colour term is *nabambala* for white. Since the Bagyeli are an ethnic group belonging to the Pygmy culture, this could be interpreted as being in line with Berlin and Kay (1969), were it not for *mbiliashye*, by which black is denoted metonymically, with reference to charcoal. Berlin and Kay (1969) claimed that at “Stage I”, “basic color terms” exist for both black and white, but this is not the case in Gyele, the language of the Bagyeli.

2.6 *Study IV*

Study IV took place in Thohoyandou in the Venda region, South Africa. Colour names of another South African culture, the Zulu, can be found in Wickler and Seibt (1995), who focus on the functions of bead colours (also see Eisleb et al., 1996). The investigation was carried out in an informal setting at the local market. There were about five respondents, three market-women and two men. The two men and at least one market-woman were fluent in English, in addition to their mother-tongue Tshivenda. They also explained when the words for the colours had an additional meaning. Stimuli were NCS colours as in Study III.

2.6.1 Results

Results (Table 6) are shown in the order that the colours were presented. Only four out of the ten colours presented have additional meanings. At first sight, this could also be seen as being in line with Berlin and Kay (1969), due to the

TABLE 6 *Results of Study IV*

English	Tshivenda	Additional meaning
Blue	<i>Lutombo</i>	Sky; little stone (any)
Yellow	<i>Dzivhalamtada</i>	
Red	<i>Muridiri</i>	Root of particular tree (medicinal use); part. textile
Green	<i>Dala</i>	Foliage of tree (any)
Orange	<i>Tshitopana</i>	
Purple	<i>Lufhafhafwandadzi</i>	
Turquoise	<i>Matarimadaladala</i>	
Brown	<i>Luvhundi</i>	Particular soil used for painting house walls
White	<i>Mutshena</i>	
Black	<i>Mutswu</i>	

status of the Venda culture, which has had a number of cultural contacts in its course of history. The Venda had settled in a region which is now Zimbabwe, before they migrated to their present territory in the 19th century. Among the Venda live the Lemba, who claim to be descendants of ancient Israelites, whose ancestors, at the time of King Salomon, had been sent to that region in southern Africa for gold mining. That claim was supported by a recent DNA survey (Thomas et al., 2000). Bearing a model of cultural synthesis in mind (Groh, 2005), one could say that the Venda, due to various cultural contacts, cannot be categorised aboriginal in terms of a pristine culture, but rather to a certain degree as advanced. The higher proportion of “basic color terms” therefore seems to affirm Berlin and Kay (1969), who would certainly categorise this culture as being at one of their proposed more advanced “stages”. Yet, a closer look shows that this is not quite consistent with the data. The Venda use a metonymical term for red, although they are supposed to have a non-metonymical one, because they have a “basic color term” for yellow, which could not occur before “Stage III”, and red is allocated to “Stage II”. They have non-metonymical terms for purple and orange which, according to the Berlin and Kay idea, only appear on the highest level, “Stage VII”. Thus, the Venda should be expected to have “basic color terms” for all colours allotted to the previous “stages”. From that perspective, something must be wrong with the Venda too, because they use metonymical terms for blue, green and brown.

2.7 Study v

Study v was carried out in the B.R. Hills (Biligiri Rangana Hills) region of southern India in Kanneri Colony, an indigenous village of the Soliga tribe (synonyms: Solega, Sholiga, Sholaga; cf., Zvelebil, 1990). The respondents were aged approximately between 20 and 50; most of the time about ten women and one man participated. The participants spoke Kannada and their Soliga dialect. The answers were given in Kannada, the regional *lingua franca*. A bilingual person, who spoke both Kannada and English, assisted in this collective interview. After screening for colour blindness with the Ishihara and Pflügerhaken tests and excluding an elderly woman who apparently suffered from cataract, NCS colours were presented as in the previous studies. The subjects were also asked if the words, by which they named the colours, had any additional meaning.

2.7.1 Results

Results (Table 7) are shown in the order that the colours were presented. The colour names were later presented to a Kannada speaker in Delhi, who translated them into English. It was confirmed that except for brown, turquoise, purple, orange, and yellow, the terms are nothing but colour nouns (cf., Zvelebil (1990, p. 419): “arsinennu [...] n. fruit of *Curcuma longa* (turmeric)”; “ars→a (s = [ʃ]) n. yellow color, adj. yellow”; “asuru (s = [s]) n. green/light blue color”; “asura vu [...] n. cpd. green snake, green viper, *Lachesis gramineus*”).

Since the presentation of the colour cards had been audio-recorded, this soundfile was presented to another Kannada-speaking academic, who commented both on the situation of data collection and on the responses (the researcher is grateful to Prof. Padakannaya, Department of Psychology, University of Mysore, for his analysis of the audio recording, which is reported in this paragraph). According to him, the whole situation was very artificial, due to the cultural dominance of the Kannada-speaking translator who prompted the answers of the subjects. For example, when the brown colour card was presented, one of the subjects first responded with the non-Kannada, presumably Soliga expression “no se”, and another subject remarked that this was not really red. Then the translator asked if it was “maasala kempu”, which is Kannada and means faded red. The subjects agreed to this suggestion. On the presentation of the black colour card, one subject first said “kappu”, which also means black, and another subject said “kari”. Then they decided for “kari banna”. Although the subjects might not have been aware of it, “kari” is also the Kannada word for elephant (and, coincidentally, as a Kannada verb, also means to call). “Banna” is the Kannada word for colour. In the naming of the turquoise colour card, the additional “dimu” is obviously derived from the English dim.

TABLE 7 *Results of Study v*

English	Kananda	Literal meaning
Brown	<i>Maasalu kempu</i>	Less red
Turquoise	<i>Haseru dimu</i>	Less green
Purple	<i>Karimi nili</i>	Less blue
Orange	<i>Arishina keseri/tamaniki</i>	
Green	<i>Acha haseru</i>	Absolute green
Yellow	<i>arishina</i>	Turmeric
Blue	<i>Nili banna</i>	Absolute blue
Red	<i>Kempu banna</i>	
White	<i>Bili banna</i>	
Black	<i>Kari banna</i>	

In the response given for purple, “karimi” is probably derived from Kannada “kadime”, meaning less. In the responses to orange, “arishina” also is the word for the turmeric spice, and “keseri” is a Kannada term meaning both saffron and yellow; “tamaniki” could be derived from English “turmeric”. The response to green, “acha haseru” is entirely Kannada, meaning absolute green. During the presentation of the colour cards, the translator even prompted unnecessary things. When the yellow card was shown, he mentioned “kamale”, which means hepatitis, although this word is not used for naming the colour.

The analysis of the sound file raises the question if these data can be used at all. They can only be used, if the particular circumstances are pointed out. The use of different descriptions for brown, turquoise, orange, and purple at first sight seems to show, from a Berlin and Kay (1969) point of view, a somewhat “advanced” culture. Such a position might even be compatible with the synthesis model, since Kannada is a language spoken by people who have been in cultural contact situations for a historically long period. But, with regard to the Berlin and Kay (1969) position, the names for yellow and black are problematic, one being the word for the turmeric spice and the other the word for elephant. Especially the latter would not be allowed by the Berlin and Kay (1969) conceptualisation.

3 General Results

Standardised colours – blue, yellow, red, green, orange, purple, turquoise, brown, white and black – were presented to indigenous persons after they had been screened for colour blindness; these indigenous persons were able to name the colours presented.

Following this, the responses were translated into a European language. Metonymical, object-related colour names were found to predominate in most of the studies, and only a minority of colour names was non-metonymical. The ratio of metonymical vs. non-metonymical colour names varied among the cultures investigated. The allocation of metonymical and non-metonymical names to the colours did not match with the “stages” proposed by Berlin and Kay (1969).

4 Discussion

Our investigation with several indigenous cultures has shown inconsistencies with the concept of Berlin and Kay (1969). These authors, as well as other researchers (e.g., Heider 1971, 1972), suggested that persons of certain indigenous cultures were not able to designate colours with their respective languages. This is definitely not true.

Certainly those researchers of the 1970s also heard some of the precise, metonymical, object-related indigenous colour words, however, accepting these terms as colour words would not have fitted into their concept. Heider and Olivier (1972) forfeited scientific standards by not allowing answers that were not compatible with their dogma – “only Dani whose color-name usage was restricted to the two basic terms “mili” (roughly “dark”) and “mola” (roughly “light”) were used” (p. 17). Correct. The Dani were used.

Strikingly, no measures were taken to even understand what the Dani said with regard to the colours presented. Symptomatically, Heider and Olivier (1972) remarked, “these terms were probably idiosyncratic descriptions rather than basic color names” (p. 345). They settled for something being “probably” that actually was at the core of the question to be investigated. The derogative tendency, typical for those contemporary positions, was also apparent, for example when Heider (1972) called the Dani “a stone-age people” (p. 15), and ascertained: “Not surprisingly, United States recognition accuracy was higher than Dani” (p. 17). She was apparently unwilling to become familiar with Dani customs, as incomprehension shines through when she reported that

the Dani women “tended to ‘chant’ the two names at a constant rate” (p. 16), referring to the two words which the subjects were only allowed to use.

It has to be noted that some European colour words, like the English turquoise and violet, are just as metonymical, object-related colour words like the Dani *mep* for red or Tshivenda *luvhundi* for brown. Orange does not only refer to the fruit; rather, that fruit’s name, from Tamil > Sanskrit > Persian > Arabic *narang*, was adapted to the name of the Burgundian Principality of Orange (where fruit was traded) and the House of Orange-Nassau (hence marigold/*Tagetes* in Northern Irish front gardens in reference to William of Orange). However, purple (German: *purpur*) refers to the Tyrian purple mollusk (German: *Purpurschnecke*), from which the authentic purple taint is taken. Turquoise refers to a semi-precious stone, violet to a flower, *mep* to blood and *luvhundi* to a particular soil. The fact that the indigenous appellation works with the same mechanism as in European languages can be underlined anecdotically with one of our field experiences: When some Dani men, on one of the days after the colour investigation, saw me crushing some berries (for the purpose of collecting the seeds), and the mash was all red, they said, “Mep!”.

Assumedly all European colour words have arisen from other meanings. This is obvious with turquoise and violet; in other cases, one can still hear it, for example, the reference to the rose in German, “rosa” (pink). The Albanian language is still relatively close to the Indo-European origin. When speakers of other European languages try to guess the meanings of the Albanian colour words *gjélbër* and *vérdhë*, they might think of resemblances to German „gelb“ and English “yellow” with regard to the first one, and to Spanish “verde” or French “vert” with regard to the latter. Well, pretty close. It is just the other way round. Albanian *gjélbër* (green), as well as German “gelb” (yellow) probably both refer to the gall, the secretion of which can be yellowish or greenish. Likewise, the Fulfulde word for yellow is *saurari*, and *saura* is the gall secretion. Some words have even switched the category of perception in the course of their history, as can be seen when comparing the Albanian word for azure or sky-blue, *káltër* (similar to the Russian language, Albanian also sees lighter blue (*káltër*) and darker blue (*blu*) as two different colours), with the German word “kalt”, which means the same as English “cold”. The processes of shifts in word use from predominantly direct referral to predominantly metonymical take historical periods, and due to individually different handling among the speakers, it is not even possible to say when a word has detached from its object reference, then purely becoming a colour name. Turquoise and violet clearly have not reached that stage, as both are still understood as object names.

Instead of wrongly claiming that Dani did not even have colour names, except for *mola* and *mili* (and even those two expressions were not properly translated, as pointed out above), one can claim that English does not even have equivalents for these two Dani words. “Colourful” is already a description, saying that something is *full of colours*. German has, more or less, an equivalent, “bunt” (the German word “farbig” might seem closer to *mola*, but (a) “farb-ig” is linguistically similarly constructed to “colour-ful”, and (b) its semantic field also covers a part of *mili*). *Mola* can be understood that something is of strong or bright colour, whereas *mili* can be understood as something being of muted, shaded or dark colour. Therefore, *mola* and *mili* are not any more or less colour terms than “colourful”, “non-colourful”, “bunt” and “unbunt”. Even a general concept, like *mola/colourful/bunt* for the visual channel, can originate from a hierarchically higher concept. Whereas Albanian *larmi* designates variety or diversity, German “Lärm” (noise) is narrowed and restricted to the auditory channel. Also see English “variegation”/German “Buntheit”. *Mola* and *mili* are additional terms to the metonymical, object-related colour words of the Dani. In that sense, the Dani language is even richer than European languages, which don’t have such a pair of opposites equivalent to *mola* and *mili*. *Mola* and *mili* were alleged to stand for light and dark (e.g., Heider and Olivier, 1972) to conform better with the idea of “Stage 1” people having terms only for black and white.

Altogether, the findings of this study can be explained in the light of the interplay of language change and cultural change. As it has been explained above, the loss of linguistic precision is an essential phenomenon that emerges along the timeline of changes from archaic to modern cultures and their languages, due to grammatical simplifications occurring during the syntheses of cultures with their respective speakers of different tongues. To avoid misunderstandings, it has to be noted that languages as systems of communication compensate the loss of grammatical precision with vocabulary accumulation and descriptive complexity.

Indigenous colour names are much more precise than the “basic color terms” of European languages. However, it has often been overlooked in the discourse that even the latter possess the very same mechanisms of naming colours. For example, if we want to buy a new car, the car salesman comes up with a catalogue of colours available for a particular car, and typically these colours are named metonymically, with reference to objects – “Alabaster”, “Graphite”, “Khaki”, “Spruce”, “Silver” (Crysler); “Titanium”, “Sealfrost”, “Topaz”, “Anthracite” (Jaguar); “Moonlight Pearl”, “Lunar Mist”, “Savannah” (Toyota) (see <http://tpcglobal.com/autocolorlibrary/> (accessed 19 July 2009)) – to linguistically convey ideas of visual impressions. The same accounts for paints

or fabrics, and even for hair tinting lotions. In the world of fashion, vanilla, saffron, lime, mint, jade, pearl, olive are terms commonly used to designate colours. Artists, designers, and other specialists who are professionally preoccupied with colours use metonymical, object-related terms to enhance precision when communicating about colours. When laypersons are confronted with a newly created colour, it could happen that he or she wouldn't know what to call it, whereas someone belonging to a peer group of experts could utilise that particular specialists' term. Indigenous persons apparently are used to spontaneously applying precise object-related colour designations. After having asked several Europeans in vain how to name a particular fashionable car colour, I asked a Latin American indigenous person, who, without hesitation, answered "naranja-bronce" (orange-bronze).

From an indigenous perspective, it can be claimed that the "basic color terms" of European languages actually aren't colour terms. If we present a colour spectrum to ten European subjects and ask them to mark the boundaries of red, blue, yellow etc., we'll receive ten different results. The same would happen if we would ask them to mark the spot where the respective colour is "focal". As we see, what we think of as colour names are rather diffuse, abstract, unspecific and fuzzy concepts. Our cognition is conditioned, even drilled, to abstractness, not to specificity. Being socialised in the industrial culture means having internalised non-natural norms.

Initially, the role of the principle of linguistic relativity was outlined with regard to studies on colour concepts in the past decades. Finally, let us have a look at the experiments of Patricia Greenfield (2004), one of which seems to prove the principle of linguistic relativity, and then another one that disproves it. The Russian language has different words for light blue (голубой) and darker blue (синий); likewise, French differentiates between light red (incarnadin) and darker red (rouge). But West and Central European languages do not differentiate between light blue and dark blue (objects of both colours can be called "blue"). The Mayan Tzotzil speakers subsume orange and red, as well as white and pink. When a pattern of alternating red and white sticks was shown to Tzotzil speaking subjects, and they were asked to copy it, some substitutions of orange for red and pink for white occurred when sticks of these various colours were provided. This seems to be in line with the idea that people cannot think something for which they do not have a word – if the language does not differentiate between particular things, then its speakers would not cognitively distinguish them. However, when Tzotzil speakers were asked to sort a heap of sticks to separate heaps of each colour, they did so, thereby clearly distinguishing pink, white, red and orange. This, in turn, shows that people are able to cognitively process perceptions and differentiate them

independently of the features of their particular language. Greenfield (2004) claims that “aesthetic preferences” (p. 143) are responsible for the respective responses to the tasks.

To conclude, we can try to explain why there have been these striking misconceptions with regard to indigenous colour concepts:

- Field research methods are inadequate when non-integrative forms of encounter prevent insight, thus yielding a lack of validity.
- Research designs are also inadequate when they lack mechanisms to counter-check the data.
- Culture-related studies need a stable foundation of culture theory upon which a reliable argumentation can be built.

Actually, the academic discourse itself is a psychological phenomenon in which the cultural imprint of researchers is reflected. With regard to both legal and epistemic aspects, the influence on an indigenous culture needs to be minimised when that culture or its features are to be investigated. Future research on cultural phenomena should less concentrate on the work done in the office and rather do integrative field work. Real contact with culture itself, respectful and thereby minimising both cultural dominance and invasiveness, will certainly lead to advances and entirely new insights.

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