ASĀDHĀRAṆA-HETVĀBHĀSA AND UDDYOTAKARA'S *VYATIREKIN* *

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Asādharaṇa-hetu is a type of pseudo-reason which is defined as the property existing in neither similar instances (*sapakṣa*) nor dissimilar ones (*vipakṣa*). In the framework of *trairūpya*-theory, this type of reason is invalid on account of the lack of the second condition, *sapakṣa-sattva* (existing in its similar instances). In other words, an association (*anvaya*) does not hold in such reasons. This is illustrated by the following example:[1]

A-1: Statement: The sound is eternal.
Reason: Because of its audibility.

On the other hand, *vyatirekin* is regarded as a type of valid inference or reason. It is advocated by Uddyotakara. He defines it as a reason having no similar instances or an inference based on such a reason,[2] which is illustrated by the following example:[3]

V-1: Statement: *nedam nirātmakam jīvaccharīram.*
Tr. This living body is not a thing without *ātman.*[4]

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1 See *PSV* (K, 131b,1-3; V, 46a,1-3 (49a,2-3)) and Hetucakraḍamaru. Cf. Frauwallner [1959], Kitagawa [1965: 185-205] and Hayes [1988: 111-131]. The modified formulae are also used in *NV*. For example, see *NV*1 under *NS* 1.2.4: p. 365,1-2.

2 See *NV* under *NS* 1.1.5: *NV*1, p. 145,1-3; *NV*2, p. 294,10-11; *NV*3, p. 43,11-12; *NV*4, p. 48,14-16; *NV*5, p. 46, 7-8 and *NV* under *NS* 1.2.4, *NV*1, p. 365,16-17; *NV*2, p. 632,25-26; *NV*3, p. 157,14 - 15; *NV*4, p. 167,1-2; *NV*5, p. 165,5-7.

3 *NV* under *NS* 1.1.35: *NV*1, p. 291,1-2; *NV*2, p. 538,21-23; *NV*3, p. 116,10-13; *NV*4, p. 126,5-8; *NV*5, p.123,3-6. This example of the inferential schema is complete one. The fragmentary one can be found in *NV*1 under *NS* 1.1.5, p. 145,1-3.

4 This statement has some problems. If "*idam*" is translated as "*this*," other living bodies can be similar instances. It will contradict with the definition of *vyatirekin*, that is, a reason having no similar instances. Randle translated this passage as follows: *The* living organism is not without a

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Reason:	*aprāṇādimattvaprasāṅgāt.* Tr. Because it would be concluded with the absurdity that it has no breath, etc.,.
Exemplification:	*yad ubhayapakṣasampratipannam aprāṇādimat tat sarvaṃ nirātmakam dṛṣṭam.* Tr. It is observed that what is accepted by both parties to have no breath, etc., is all that has no *ātman.*[5]
Application:	*na cedam aprāṇādimad bhavati.* Tr. But it is not a thing without breath, etc.,
Conclusion:	*tasmān nedaṃ nirātmakam.* Tr. Therefore, it is not a thing without *ātman.*

Although we can see a great difference between the example of *asādhāraṇa* and that of *vyatirekin*, association (*anvaya*) does not hold in both cases. This fact has made us confused.

This essay will examine the difference between *asādhāraṇa-hetvābhāsa* and Uddyotakara's *vyatirekin*, and to clarify the condition of the valid reasons in Uddyotakara's logical system.

Someone might consider both to be valid. In each case a dissociation (*vyatireka*) holds. The dissociation relation might be formulated in the next formula: $\neg\exists x(\mathbf{H}x \wedge \neg \mathbf{S}x)$. (In this formula H and S stand for the evidence (*hetu*) and the property to be proven

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soul (Randle [1930: 241]). However, I don't know any case where "*idam*" can be translated as "*the*" in the sense of general. In the most Sanskrit sentences, it is used to indicate a particular something in present.

5 Someone might consider this formula to be a logical fallacy. That is to say, Uddyotakara seems to commit the fallacy of denying antecedent. However, I have proposed the conjecture that this type of construction in *NV* means a bi-conditional but not conditional. See Okazaki [1995: 492-493]. Judging from an observation made after the above essay, my conjecture must be changed into following schema: (1) The construction "*yat ... A ... tat sarvam ... B ...*" always means bi-conditional. That is to say *A* if and only if *B*. (2) The construction, "*yat ... A ... tat ... B ...*" means conditional in some cases and bi-conditional in others. That is to say, this construction is used in both senses, if *A* then *B* and *A* if and only if *B*. (3) In the case when Uddyotakara intends to indicate only conditional, he uses the construction "*sarvam ... A ... B*" or "*yat yat ... A ... tat tat ... B ...*" As a matter of fact, Pāṇini states that the repetition denotes a repetition of an action or pervasion (*vīpsā*) of something. See *P.* 8.1.4. Although the verification of this conjecture is beyond the scope of this essay, I will point out an inference on which this change of my conjecture is based: *kasmāt? asparśatvāt yat sparśavad bhavati tad vyuhyate pratibadhnati ca, na tv evaṃ dharmakam ākāśaṃ tasmād apratighāti. sa bhavān sāvayave sparśavati dravye dṛṣaṃ viparīte nāśaṅkitum arhatīti.* (*NV*1 under *NS* 4.2.22, pp. 1062,12-1063,9). This is Uddyotakara's paraphrase of the following Vātsyāyana's description, which proves that *ākāśa* does not obstruct the movement. *kasmāt? asparśatvāt. viparyaye hi viṣṭambho dṛṣa iti sa bhavān sāvayave sparśavati dravye dṛṣaṃ dharmaṃ viparīte nāśaṅkitum arhati* (*NBh*1, p. 1063,1-2). If I do not change my conjecture into (2), the boldfaced phrase in *NV* will indicate that Uddyotakara commits the fallacy of denying antecedent.

(*sādhya*) respectively.) From a "classical" logical point of view,[6] this formula is the logical equivalent to a universal proposition ($\forall x(\mathbf{H}x \supset \mathbf{S}x)$). Therefore, the major premises of both cases seem to hold.

On the contrary, someone might consider both to be invalid. For example, Hayes's interpretation of Diṅnāga's logic is agreeable. His concept of *induction domain* is useful to interpret Indian logic. He formulates the *trairūpya* of valid reasons as follows:[7] (1) $\exists x(\mathbf{P}x \wedge \mathbf{H}x) \wedge \neg\exists x(\mathbf{P}x \wedge \neg\mathbf{H}x)$ (*pakṣadharmatā*: P stands for the subject (*pakṣa*) class. Hayes considers the subject class in his formulation.). (2) $\exists x(\neg\mathbf{P}x \wedge \mathbf{H}x \wedge \mathbf{S}x)$ (*sapakṣa-sattva*). (3) $\neg\exists x(\neg\mathbf{P}x \wedge \mathbf{H}x \wedge \neg\mathbf{S}x)$ (*vipakṣa-asattva*). I think his model is one of the most successful logical interpretations of Dignāga's logic. However, his model could not explain the validity of *vyatirekin*, while it could explain the invalidity of *asādhāraṇa*. The *vyatirekin* cannot satisfy the condition (2) in any way.

Although there might be other possible models including the example I have cited above, they are not intended for Uddyotakara's logical system. In his system, *vyatirekin* is valid, and *asādhāraṇa* is not. We must examine his descriptions about *asādhāraṇa* and *vyatirekin*, and Randle's interpretation of them.

Uddyotakara adduces the following example of *asādhāraṇa*, and explains:

A-2: Statement: *nityā pṛthivī.*
Tr. The earth is eternal.
Reason: *gandhavattvāt.*
Tr. Because it is possessed of smell.

He explains it in two ways.

M-1: *yadi tarhi asādhāraṇo dharmo hetur nityā pṛthivī gandhavattvād ity ādayo hetavaḥ prāpnuvanti, na, hetvarthāparijñānāt, satyam asādhāraṇo vaidharmyahetuḥ na punar vaidharmyaṃ vyabhicāri gandhavattvaṃ ca nityānitya-vyabhicāri, tasmād anvayino vyatirekiṇaś ca nānvaya-vyatirekau hetubhāvanimittaṃ kin tv anvayavyatirekayor*

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6 I use this term in the sense of mathematical logic.

7 Hayes [1988: 122]. The following symbolization accords to my style, not to Hayes's. This re-formulation is made for readability. I think this modification will not injure his concept.

avyabhicāra iti.[8]
Tr. Objection: If the unique property would be [accepted to be] a valid reason [in the case of *vyatirekin*], then such reasons as "the earth is eternal because it is possessed of smell" would also be accepted as valid. Answer: No, because of a misunderstanding of the true meaning of the valid reason. It is true that some unique properties can be [valid] negative reason. On the contrary the negative but diverging one is not [valid]. The possession of smell is also fallaciously concluded with both eternal and non-eternal. Therefore, in both cases of the affirmative [valid] reason and the negative [valid] reason the association and the dissociation cannot form the [determinative] cause for their validity, but the infallibility of the association and the dissociation does.

M-2: ... *na cānvayam antareṇa hetuḥ sidhyati? na, viparyayasambandhasyāvyabhicārāt nāyam anvayṇī hetur* (Variant noted in *NV*4 and *NV*5: *anvayahetur*) *api tu vyatirekī hetuḥ* (Variant noted in *NV*4 and *NV*5: *vyatirekahetuḥ*), *tatra vyatireka-sambandhāvyabhicāraḥ* (*NV*3 and Variant noted in *NV*4 and *NV*5: *vyatirekahetoḥ ca viparyayasambandhāvyabhicāraḥ*) *sāmarthyam, ... atha manyase yadi vyatirekī hetur bhavaty anvayam antareṇa atha pṛthivyādinityatve sādhye gandhavattvaṃ kasmān na hetuḥ? na hetur ubhayavyāvṛtteḥ. yasmād gandhavattvaṃ nityāc cānityāc ca vyāvartate.*[9]
Tr. Objection: (There is no association in the reasoning of *NS* 3.1.3.) Then the valid reason is not given without its association. Answer: No, because of the infallibility of the relation to the opposite.[10] This (viz. the reason of *NS* 3.1.3) is not an affirmative reason but negative one. In addition, the infallibility of the relation to the opposite[11] is effective in this case. ... Objection: If you consider the negative reason to be

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8 *NV* under *NS* 1.1.35: *NV*1, p. 294,1-4; *NV*2, pp. 539,25-240, 2; *NV*3, pp. 117,19-118,1; *NV*4, p. 127,17-22; *NV*5, p. 124,15-20.

9 *NV* under *NS* 3.1.3: *NV*1, pp. 715,11-716,8; *NV*3, p. 330,6-12; *NV*4, pp. 352,19-353,7; *NV*5, pp. 349,23-350,8.

10 Someone may think the term "*viparyayasambandh*" is an adjective compound, and means "*the reverse relation.*" However, the adjectival usage of *viparyaya* is hardly found in *NV*. I think that *viparyaya* is equivalent to the term *ataddharma* in *NS* 1.1.36-37 and *NBh* under them, means the opposite.

11 Considering this phrase and some other examples, (Uddyotakara uses the term, *viparyayasambandhāvyabhicāra* also in the explanation of *vyatirekin* in *NV* under *NS* 1.1.23. *NV*1, p. 245,6-7: *evaṃ vyatirekiṇo 'pi saty asādhāraṇatve viparyayasambandhasyāvyabhicārād dhetubhāva iti.*) Thakur's reading would be more reasonable. We, however, can not neglect easily the reading of other editions in consideration that we find the term, *anvayasambandhāvyabhicāra*, which seems to be antonym of *vyatirekasambandhāvyabhicāra*, in *NV* under *NS* 1.1.35.

> valid without association, then the possession of smell is a valid reason in the case where the eternity of the earth will be proven, isn't it? Answer: No. For this reason (viz. the possession of smell) is excluded from both domains. That is to say, the possession of smell is excluded from eternal entities and non-eternal ones.

Both of M-1 and M-2 insist upon the following two points: (1) Neither mere association (*anvaya*) nor mere dissociation (*vyatireka*) warrants the validity of reasons. (2) The infallibility (*avyabhicāra*) of either association or dissociation forms the determinative cause for every valid reason. This is the reason why *vyatirekin* is valid but *asādhāraṇa* not.

Although Uddyotakara's description is clear, some concepts, especially *avyabhicāritva*, remain to be clarified. First of all let us examine Randle's interpretation. He is the first modern scholar that investigated Uddyotakara's description, and Randle's interpretation seems to be most popular. He explains Uddyotakara's thought depending on M-1.

> The condition of validity, whether of a positive or of a negative argument, is not the mere concomitance of M and P (in the former case) nor of non-M and non-P in the latter case; in either case, the *avyabhicaritva* of the concomitance, i. e. the fact that M is not found with non-P in the former case, and the fact that non-M (the *vaidharmya*) is not found with P in the latter case. Now in the case of the 'too restricted fallacious reason' non-things, which are not objects of hearing, some are eternal, but some are non-eternal. ... But in the case of 'the purely negative argument' the organism has a soul because possessed of vital functions, non-M is only found with X non-P for the simple reason that there are no XP's, S being the only P; and M is restricted to S.[12]
> (In this citation, P, M, S and X stand for *the property to be proven*, *the evidence*, *the subject* and *something to be exemplified* respectively.)

The *avyabhicāritva* of the concomitance in his explanation will be formulated as follows:

Fact 1: *anvaya-avyabhicāra*: $\exists x(\mathbf{M}x \wedge \mathbf{P}x) \wedge \neg\exists x(\mathbf{M}x \wedge \neg\mathbf{P}x)$

Fact 2: *vyatireka-avyabhicāra*: $\exists x(\neg\mathbf{M}x \wedge \neg\mathbf{P}x) \wedge \neg\exists x(\neg\mathbf{M}x \wedge \mathbf{P}x)$

12 Randle [1930: 242-243].

Randle concludes that a valid reason satisfies either the above Fact 1 or 2. There, however, remains a problem in his interpretation. It is sure that *vyatirekin* satisfies Fact 2, and that *asādhāraṇa* does not. As a matter of fact, some non-eternal entities have no smell. Fact 2, however, holds in some invalid reasons, for example, "This is cow, because it is possessed of the horn," which is a typical pseudo-reason and called inconclusive (*anaikāntika*). Since we cannot find any cow having no horn, this reason satisfies Fact 2, but may lead us to an incorrect conclusion. For example, we might regard a deer as a cow on ground of this reason. In conclusion, Fact 2 can distinguish *vyatirekin* and *asādhāraṇa*, but not be a definitive criterion for valid reason.

I think that *avyabhicāritva* must be a criterion for valid reason as well as a distinctive feature between *vyatirekin* and *asādhāraṇa*. In addition, I believe that *anvaya-avyabhicara* and *vyatireka-* (or *viparyayasambandha-*) *avyabhicāra* must be independent criteria of each other. We must search for such an interpretation of these terms, otherwise we will have failed in our explanation of Uddyotakara's description.

As a beginning, we will examine the concept of *avyabhicārin*. Although Uddyotakara does not directly define this term, some related descriptions will define it. In the definition of *anaikāntika*-pseudo reason (*NS* 1.2.5), Uddyotakara defines *vyabhicāra*, and indicates that *aikāntika* is its antonym.[13] Additionally he clearly defines *vyavaccheda-hetu* and its antonym, *samānadharma* (or *avyavaccheda-hetu*), which is defined in the same way as *vyabhicāra*, in the explanation of the cause of doubt (under *NS* 1.1.23)[14]. To sum up these descriptions, we can define *avyabhicārin* as follows:

AVDef. 1 *sādhyatajjātīyavṛttitve sati anyatra na vartate*
Tr. existing in what is to be proven and its similar instances, and not in the other.

AVDef. 2 *ekasmin ante niyataḥ*
Tr. being restricted to an only conclusion

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13 *teṣāṃ anaikātikaḥ savyabhicāraḥ ekasminn ante niyata aikāntika viparyayād anaikāntikaḥ, kaḥ punar ayaṃ vyabhicāraḥ? sādhyatajjātīyānyavṛttitvam – yat khalu sādhyatajjātīyavṛttitve sati anyatra vartate tad vyabhicāri, tadvṛttitvaṃ vyabhicāraḥ*: *NV*1, p. 373,3-5.

14 *vyavacchedahetuś ca bhavati samānaś ca dharma iti na yujyate, vyavacchedahetur nāma vivakṣitatajjātīyavṛttitve sati yo vijātīyāvṛttiḥ sa vyavacchedahetuḥ, tasya ca samānārthatā nāsti. samāno hi dharmo yo vivakṣitatajjātīyavṛttitve sati anyajātīyavṛttiḥ*: *NV*1, p. 237,8-10.

The feature of *avyabhicārin* is *avyabhicāra.*

This can be explained in the following manner. Suppose that the world is divided into two domains, that is, a desired one and an undesired one. The *dharma* defined as *avyabhicārin* exists only in the desired domain but not in the undesired one, whether the *dharma* is affirmative or negative.

This interpretation might coincide with Randle's Fact 1. In other words, Randle's interpretation can explain *anvaya-avyabhicāra* well. If any changes are needed, they will be minimum. Fact 2 also seems to coincide with the above definition of *avyabhicārin* on the condition where non-M can be interpreted as non-P-*avyabhicārin*. We, however, cannot accept such a condition, because we have observed the phrase "*gandhavattvaṃ ca nityānityavyabhcāri*" in M-1. It means that the possession of smell is concluded with both eternal and non-eternal in the ordinary sense. Therefore, if it is a failure of *vyatireka-avyabhicāra*, it will follow from this description of the *asādhāraṇa*-reason that M must be P-*avyabhicārin* also in the case of *vyatireka-avyabhicāra*. It would make us confused. To resolve this puzzle, we must examine this example of *asādhāraṇa*-reason through observation of the descriptions made in M-1 and M-2.

First of all, let us formulate the phrase of M-1 in question. It will be as follows:

M-1F: $\mathbf{H}_G \rightarrow \mathbf{S}_N$ and $\mathbf{H}_G \rightarrow \neg\mathbf{S}_N$

(In the above formulae, $\mathbf{H}_G$ and $\mathbf{S}_N$ stand for the possession of smell and eternal respectively. $\rightarrow$ is used in general and everyday sense. I will henceforth use the symbol "$\rightarrow$" in this sense. In the case when any logical precision is needed, I will use the symbol "$\supset$" standing for the so-called material implication.[15])

It does not differ from the case of *asādhāraṇa-hetvābhāsa* or *anaikāntika*. The description of M-2 offers the key to an understanding of this case. The phrase of M-2, "*gandhavattvam nityāc cānityāc ca vyāvartate*," which means that the possession of smell is excluded from eternal entities and non-eternal ones, and can be formulated in the same manner as M-1.

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15 Excluding some metaphorical sense, we can safely say that the relation $\rightarrow$ implies $\supset$. That is to say, the condition $A \supset B$ is weaker than $A \rightarrow B$.

M-2F: $\neg \mathbf{S}_N \rightarrow \neg \mathbf{H}_G$ and $\mathbf{S}_N \rightarrow \neg \mathbf{H}_G$

M-2F is symmetrical with M-1F. If the law of contraposition holds in Uddyotakara's logical system, $\mathbf{H}_G \rightarrow \neg \mathbf{S}_N$ of M-1F would be logically equivalent to $\mathbf{S}_N \rightarrow \neg \mathbf{H}_G$ of M-2F. Roughly speaking, M-2F, which is naturally deduced from the unique property, implicitly means *vyabhicāra*. Conversely M-2F is the meaning of *vyabhicāra* in this context, while it is dubious that the law of contraposition holds in Uddyotakara's logical system.[16]

From the other point of view, M-1F means that every property is deducible from $\mathbf{H}$, and M-2F insists that $\neg \mathbf{H}$ is deducible from any properties. According to our knowledge of logic, it means that $\neg \mathbf{H}$ is tautology and $\mathbf{H}$ is always false in the both cases of M-1F and M-2F. That is to say, M-1F and M-2F have the same meaning in this sense. Besides we can safely say that only $\neg \mathbf{S} \rightarrow \neg \mathbf{H}$ holds and $\mathbf{S} \rightarrow \neg \mathbf{H}$ always fails in the case of *vyatirekin*. Although some problems remain in the interpretation of "$\rightarrow$," this point of view is useful for our understanding of the validity of reasons in the logical system of Uddyotakara.

We shall examine the meaning of "$\rightarrow$" in the formulae of M-1F and M-2F, although you may feel some doubt as to whether the "$\rightarrow$" have the same meaning in M-1F and M-2F. First of all, we must formulate the concept *avyabhicāra*, which is logically well defined in the case of Uddyotakara, as I have shown in AVDef. 1 and AVDef. 2. It is obvious that this concept is closely related to both *anvaya* and *vyatireka* as we have observed in M-2. Below is my formulation of B-*avyabhicāri* A on the basis of AVDef. 1, as follows.

Formula 1: $\exists x(\mathbf{A}x \wedge \mathbf{B}x) \wedge \neg \exists x(\mathbf{A}x \wedge \neg \mathbf{B}x)$

Or taking into consideration the domain of the subject (*pakṣa*), which is symbolized by P, we must transform Formula 1 into the following formulae.

Formula 2:
$\exists x(\mathbf{P}x \wedge \mathbf{A}x) \wedge \exists x(\neg \mathbf{P}x \wedge \mathbf{A}x \wedge \mathbf{B}x) \wedge \neg \exists x(\mathbf{A}x \wedge \neg \mathbf{B}x \wedge \neg \mathbf{P}x)$

16 I don't think that the law of contraposition generally holds in early Indian logic, while some early Indian logicians might have found it.

Suppose that A and B stand for the evidence (H) and the property to be proven (S) respectively, someone might think that Formula 2 is logically equivalent to so-called *trairūpya* conditions of the valid reasons. Needless to say, Formula 2 will explain Dignāga's criteria for the valid reasons without the precise meaning of the first condition, *pakṣadharmatā*.[17] On the other hand, even in the case when A and B are replaced by $\neg\mathbf{S}$ and $\neg\mathbf{H}$ respectively, neither Formula 1 nor 2 can differentiate Uddyotakara's *vyatirekin* from *asādhāraṇa-hetvābhāsa*. Formula 1 or Formula 2 holds in both cases. Therefore, we cannot say that the transformed Formula 1 or 2 where A and B are replaced by $\neg\mathbf{S}$ and $\neg\mathbf{H}$ is *vyatireka-avyabhicāra* in Uddyotakara's sense.

However, the relation, B-*avyabhicāri* A, which is formulated in Formula 1, is useful for our discussion. This relation, as I have shown in AVDef. 1, can be defined on the basis of the domains named *sādhya* (=*pakṣa*), *sajātīya* (=*sapakṣa*) and *vijātya* (=*vipakṣa*), and independent of ontological issues. We can regard this relation as a pure logical one. Besides, considering the definition of this relation, we would find its similarity to the logical implication. As far as my limited observations go, I have not found any other concepts that can replace B-*avyabhicāri* A in *NV*. Therefore, even though the concept of *avyabhicāra* does not directly connect with *vyatireka-avyabhicāra*, we must set up another criterion for the validity of *vyatirekin* on the basis of the concept of *avyabhicāra*.

As a matter of convenience, we shall use $\mathbf{A} \Rightarrow \mathbf{B}$ standing for B-*avyabhicāri* A, which is formulated in Formula 1.[18] You can easily see that $\mathbf{A} \Rightarrow \mathbf{B}$ is not logically equal to $\neg\mathbf{B} \Rightarrow \neg\mathbf{A}$.[19] Therefore each

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17 Cf. Hayes [1988: 122].

18 I will not henceforth use Formula 2. It is not necessary to mention the domain of *pakṣa* in the following discussion. Besides, Formula 2 is too complicated, even though it reflects Uddyotakara's concept of *avyabhicāra* more precisely.

19 As a matter of fact, we cannot deduce $\neg\mathbf{B} \Rightarrow \neg\mathbf{A}$ from $\mathbf{A} \Rightarrow \mathbf{B}$, and $\mathbf{A} \Rightarrow \mathbf{B}$ from $\neg\mathbf{B} \Rightarrow \neg\mathbf{A}$ in any strong logical system without contradiction. It, however, might be worthwhile to bestow some consideration on the condition for their logical equivalence. For this consideration, suppose the following schema.

$\Delta_1, \mathbf{A} \Rightarrow \mathbf{B} \mapsto \neg\mathbf{B} \Rightarrow \neg\mathbf{A}$ (X, Y $\mapsto$ Z means that Y is deducible from X and Y)

The subject of our consideration is Δ_1. In the preceding schema, $\mathbf{A} \Rightarrow \mathbf{B}$ represents the conjunction of $\exists x(\mathbf{A}x \wedge \mathbf{B}x)$ and $\neg\exists x(\mathbf{A}x \wedge \neg\mathbf{B}x)$. Substituting this formula for $\mathbf{A} \Rightarrow \mathbf{B}$, we can calculate the condition Δ_1. Throughout such a calculation, we can obtain a possible Δ_1, which is minimum and not a logical contradiction, $\exists x(\neg\mathbf{A}x \wedge \neg\mathbf{B}x)$. It means that there is at least one dissimilar instance.

$\Delta_2, \neg\mathbf{B} \Rightarrow \neg\mathbf{A} \mapsto \mathbf{A} \Rightarrow \mathbf{B}$

case must be verified. Considering these facts, our verification can be represented in the following tables, in which both A and B must be understood as "induction domain" excluded from the domain of subject. In this table, I have examined only four combinations, but think that it will be sufficient. In verifying $\mathbf{A} \Rightarrow \mathbf{B}$, what is desired to be concluded are B or $\neg\mathbf{A}$. In addition, if B-*avyabhicāri* A holds then non-B-*avyabhicāri* A necessarily fails.

A	B	$\exists x(\mathbf{A}x \wedge \mathbf{B}x)$	$\neg\exists x(\mathbf{A}x \wedge \neg\mathbf{B}x)$	$\mathbf{A} \Rightarrow \mathbf{B}$
G = having a smell (*gandhavat*)	N = eternal (*nitya*)	Fails	Holds	Fails
$\neg\mathbf{G}$	N	Holds	Fails	Fails
$\neg\mathbf{N}$	$\neg\mathbf{G}$	Holds	Holds	Holds
N	$\neg\mathbf{G}$	Holds	Holds	Holds

Table 1 (In the case of A-2)

A	B	$\exists x(\mathbf{A}x \wedge \mathbf{B}x)$	$\neg\exists x(\mathbf{A}x \wedge \neg\mathbf{B}x)$	$\mathbf{A} \Rightarrow \mathbf{B}$
P =having the breath, etc. (*prāṇādimat*)	K = having *ātman* (*ātmaka*)	Fails	Holds	Fails
$\neg\mathbf{P}$	K	Fails	Fails	Fails
$\neg\mathbf{K}$	$\neg\mathbf{P}$	Holds	Holds	Holds
K	$\neg\mathbf{P}$	Fails	Holds	Fails

Table 2 (In the case of V-1, which is discussed in M-1 and M-2.)

Table 1 agrees with the description M-2 of the *asādhāraṇa*-pseudo reason, but M-1. If you interpret *vyabhicāra* as a failure of *avyabhicāra*, M-1 would be meaningful in Table 1. Contrarily, the example of *vyatirekin*, V-1 is represented in Table 2. The difference between *asādhāraṇa*-pseudo reason and *vyatirekin* appears in the last lines of both tables.

Comparing with Hayes's table of sixteen possible configurations of the "Induction Domain,"[20] most of us would accept that Table 1

Conversely, Δ_2 is $\exists x(\mathbf{A}x \wedge \mathbf{B}x)$, which means the existence of similar instances. Therefore, form this logical point of view, we can say that $\mathbf{A} \Rightarrow \mathbf{B}$ and $\neg\mathbf{B} \Rightarrow \neg\mathbf{A}$ are logically equivalent on the condition that there are both similar and dissimilar instances.

20 Hayes lists up the four compartments of induction domain: (1) $\mathbf{H} \cap \mathbf{S}$, (2) $\neg\mathbf{H} \cap \mathbf{S}$, (3) $\mathbf{H} \cap \neg\mathbf{S}$ and (4) $\neg\mathbf{H} \cap \neg\mathbf{S}$ (H and S stand for the class of *hetu*-possessors and that of *sādhya-dharma*-possessors respectively). In the case of Table 1, (1) and (3) are empty, and others not. In the case of Table 2, only (4) is not empty. See Hayes [1988: 115].

and 2 can be easily deduced from Uddyotakara's sixteen classification of valid and invalid reasons. Although the above check list represented in Table 1 or 2 is only a hypothesis built up from the descriptions of *vyabhicāra* and the sixteen classifications of valid and invalid reasons, we can induce the following two conditions of the valid reason from the tables and Uddyotakara's description summarized in M-1F and M-2F. (H and S stand for the evidence and the property to be proven respectively.)

CV1: $\mathbf{H} \Rightarrow \mathbf{S}$ holds (*anvaya-avyabhicāra*)
CV2: $\neg\mathbf{S} \Rightarrow \neg\mathbf{H}$ holds, but $\mathbf{S} \Rightarrow \neg\mathbf{H}$ not. (*vyatireka-avyabhicāra*)

	The Induction Domains				The logical Relation between **H** and **S**				Condition
	H∩S	**¬H∩S**	**H∩¬S**	**¬H∩¬S**	**H ⇒ S**	**¬H ⇒ S**	**¬S ⇒ ¬H**	**S ⇒ ¬H**	**CV1, 2**
1	+	∅	+	∅	F	F	F	F	
2	+	∅	+	+	F	F	F	F	
3	+	∅	∅	+	T	F	T	F	1 and 2
4	∅	+	+	∅	F	T	F	T	
5	∅	+	+	+	F	F	F	T	
6	∅	+	∅	+	F	F	T	T	
7	+	+	+	∅	F	T	F	F	
8	+	+	+	+	F	F	F	F	
9	+	+	∅	+	T	F	T	F	1 and 2
10	+	∅	∅	∅	T	F	F	F	1
11	+	+	∅	∅	T	T	F	F	1
12	∅	+	∅	∅	F	T	F	T	
13	∅	∅	+	∅	F	F	F	F	
14	∅	∅	+	+	F	F	F	F	
15	∅	∅	∅	+	F	F	T	F	2
16	∅	∅	∅	∅	F	F	F	F	

Table 3: Uddyotakara's sixteen classifications of valid and invalid reasons

The valid reason must satisfy either of CV1 or CV2. It is a legitimate reason as to why the *vyatireki*-reason is valid but the *asādhāraṇa*-pseudo reason not. Let us test the above conditions in terms of Uddyotakara's sixteen classifications of valid and invalid reasons.[21]

In Table 3, the possible configurations of the "Induction Domain" are arranged in accordance with Uddyotakara's table of sixteen

21 Cf. *NV*1, pp. 364,11-365,18; *NV*2, p. 632,2-27; *NV*3, pp. 156,13-157,16; *NV*4, pp. 166,3-167,3; *NV*5, pp. 164,6-165,8. And also see Hayes [1988], p. 115.

classifications of valid and invalid reasons, and the numbers in the first column to correspond to Uddyotakara's ordering of reasons. The boldfaced numbers correspond the valid reasons. In column 2 - 5, ∅ stands for empty, and + means something exist. The conditions that are fulfilled by the reason on the line are noted in the last column. It will follow from a brief observation of Table 3 that CV1 and CV2 can be potential criteria for valid reason.

Table 3 coincides with Uddyotakara's explanation. He says that 3 and 9 are *anvayavyatirekin*, that 10 and 11 are *anvayin*, that 15 is *vyatirekin* and that others are pseudo reasons.[22] That is to say, *anvayavytirekin* satisfies both of CV1 and CV2, and *anvayin* only CV1. Case 6 is the *asādhāraṇa*-pseudo reason which has been examined. The case of 12 and 16 remain to be examined. Although any more comments are not added to case 12, it can be regarded in the same manner as *asādhāraṇa*-pseudo reason,[23] judging from the examples. Case 16 is the most interesting among the remaining cases. Uddyotakara makes some comments on it in another portion, and the comments agree with what is observed in Table 3 as well as my hypothesis.[24] Conclusively these facts support my hypothesis that CV1 and CV2 are the condition of valid reason in the logical system of Uddyotakara.

To sum up my discussion, we can find the difference between *vyatirekin* and *asādhāraṇa*-pseudo reason in Uddyotakara's description of M-1 and M-2. Especially, M-2 is very interesting from the logical point of view. That is to say, the *asādhāraṇa*-pseudo reason is the case when both $\neg\mathbf{S} \rightarrow \neg\mathbf{H}$ and $\mathbf{S} \rightarrow \neg\mathbf{H}$ hold. It means that $\neg\mathbf{H}$ is tautology, and that $\mathbf{H}$ is always false. Uddyotakara avoids this case, and must define *vyatirekin* as the case when $\neg\mathbf{S} \rightarrow \neg\mathbf{H}$ holds but $\mathbf{S} \rightarrow \neg\mathbf{H}$ does not. Instead of $\rightarrow$, introducing the concept of

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22 See *NV*1, p. 365,19-21.

23 The case 6 is the modified form of A-1, The case 12 is as follows: Statement: Sound is eternal (*nityaḥ śabdaḥ*). Reason: Because of its audibility (*śravaṇatvāt*). The reason of 12 is the same as 6, and its inferential object is the negation of that of 6. See *NV*1, p. 365,12.

24 The case where neither similar nor dissimilar instance exist is discussed according to the possibility of *anvaya* and *vyatireka*. Uddyotakara illustrates such a case with the following example. Statement: Everything is eternal (*sarvaṃ nityam*). Reason: Because it is to be the object of knowledge (*prameyatvāt*). In *NV* under *NS* 1.1.35, he also adduces another example. Statement: Everything is eternal (*sarvaṃ nityam*). Reason: Because it is an existing entity (*sattvāt*). He explains that this sort of reason can never excluded (*vyāvṛtta*), and that the property that can never be excluded is not a valid reason. See *NV*1, p. 294,4-6. That is to say, Uddyotakara insists the invalidity of such a reason on the ground that neither *vyatireka* nor *anvaya* is possible. It obviously agrees with my hypothesis.

⇒, which I have defined in terms of Formula 1 on the basis of the concept of *avyabhicāra*, makes us possible to formulate the criteria of Uddyotakara's valid reason, and to explain his sixteen classifications of the valid and invalid reasons. CV1 and CV2 result from the above observations and discussions.

Although some problems remain in my hypothesis,[25] the criteria of the valid reasons summarized in CV1 and CV2 are consistent with Uddyotakara's description, and are therefore reliable.

Concerning these criteria presented in CV1 and CV2, whether they are valid or not, it must be noticed that they can explain only some aspects of Uddyotakara's *vyatirekin*. That is to say, they can only explain the character of *vyatirekin* within the framework of the *trairūpya*-theory or that extended by Uddyotakara. In Uddyotakara's description of the inference, considerable significance is attached to the *dharma-dharmi*-relation, and Uddyotakara makes another definition of *vyatirekin* based on it in *NV* under *NS* 1.1.35. CV1 and CV2, however, seem not to be concerned with such a definition directly. I think that the concept of *vyatirekin* is not totally clarified without it. In addition, observing *NV* under *NS* 2.1.35, I feel some doubt whether Uddyotakara' *vyatirekin* is equivalent to *kevala-vyatirekin* of later Indian logicians. I think the concept of *vyatirekin* must be further examined from the epistemological point of view.

ABBREVIATIONS AND BIBLIOGRAPHY

SANSKRIT SOURCES:

NBh: *Nyāyabhāṣya* of Vātyāyana. See *NV*1.

NS: *Nyāyasūtra* of Gautama. See *NV*1.

NV: *Nyāyavārttika* of Uddyotakara

*NV*1) *Nyāyadarśana with Vātsyāyana's Bhāṣya, Uddyotakara's Vārttika, Vācaspati Miśra's Tātparyaṭīkā and Viśvanātha's Vṛtti*, ed. by Nyaya Tarkatirtha Taranatha and Tarkatirtha Amarendoramohan, Calcutta Sanskrit Series, Calcutta: 1936-44, reprinted Kyoto: Rinsen Book Co. 1982.

*NV*2) *Nyāyadarśana of Gautama with the Bhāṣya of Vātsyāyana, the Vārttika of Uddyotakara, the Tātparyaṭīkā of Vācaspti and the Pariśuddhi of Udayana*, (1st adhyāya only) ed. by Anantalal Thakur, Mithila Institute Series, Mithila: 1967.

*NV*3) *Nyāyabhāṣyavārttika of Bhāradvāja Uddyotakara*, ed. By Anantalal Thakur, New Delhi: 1997.

*NV*4) *Nyāyavārttikam*, ed. by V.P. Dvivedin, Bibliotheca Indica. Calcutta: 1907, reprinted Delhi: 1986.

*NV*5) *Nyāyavārttika*, ed. By V.P. Dvivedin and L.S. Drāvida, Kashi Sanskrit Series,

25 For example, I have regarded *ubhaya-vyāvṛtti* as *vyatireka-avyabhicāra* in the formulation of CV2, As far as my limited observations go, there is no ground for such an interpretation. In addition these criteria, especially CV2, are complicated and sophisticated. I am afraid that their complexity prevents their verification.

Benares: 1915.
P: Pāṇini's *Aṣṭādhyāyī*.
PSV: *Pramānasamuccayavṛtti* of Diṅnāga.
V) Vasudhararakṣita's Tibetan translation, Sde-dge ed. Tohoku No. 4204; Peking ed. Otani No. 5701. (Folio number of Peking ed. is given in parenthesis)
K) Kanakavarman's translation, Peking ed. Otani No. 5702.
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