Beliefs about Creativity:
Views of Tertiary Students in Hong Kong

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Abstract

Background: Creativity is associated with many pet beliefs, unfounded or based on limited personal experiences and observations.

Aims: The intention of the present study is to take the research one step backward to look at possible antecedents of beliefs regarding creativity, as such knowledge has implications for education where creativity is concerned. The present study attempts at uncovering the beliefs regarding various aspects of creativity among tertiary students in Hong Kong.

Sample: Students (N=139) from a teacher education institute (67.6%) and a university (32.4%) in Hong Kong were asked to complete a questionnaire about beliefs in creativity. Participation was voluntary and the respondents were assured of anonymity. As the respondents formed a convenient sample (as is true of many studies of similar nature), no representation is claimed.

Method: A questionnaire of 30 items that included 15 aspects of beliefs in creativity was presented to the respondents in the form of a series of six-point Likert scales. To avoid possible carrying-over effect, the two items for the same aspect were separated systematically, with items for the other aspects intervening. Surveys were conducted and the general written responses received from the respondents were tabulated.

Results: The respondents agreed more strongly that creativity (a) is dependent of culture, (b) is the result of consistent effort, (c) can be found in everyone, and (d) is general across many fields. On the other hand, they disagreed that creativity has to do with gender and birth order. Five aspects were dropped due to inappropriate reliability.

Conclusion: In view of the complexity of the findings, efforts in developing creativity in tertiary students need to take into account their demographic backgrounds so that correct beliefs can be further strengthened and incorrect ones can be rectified early in the creativity training programmes.

Keywords: **creativity, beliefs, implicit theory**

香港一些大學生對創意的信念

摘要

背景：創意常與一些無理由或根據有限的個人經驗和觀察的信念聯繫在一起。

目的：本課題意圖將研究倒後推展一步，尋找有關創意的可能前設，因爲這方面的知識對有關創意的教育有一定的涵義。本研究試圖在揭露香港一些大學生對創意各方面的信念。

調查對象：來自香港一所教育學院(67.6%) 和另一所大學(32.4%)的 139 位學生填答了一份查詢關於創意各方面信念的問卷。調查純屬自願和匿名，因取樣基於方便的理由(類似的研究大多如是)，結果不能隨意推論。

調查方法：參與學生填答了一份卅題採用了六點的黎克爾量表模式的問卷，其中包括了關於創意十五方面的信念，每個信念由兩條相約的題目去探索，爲避免這兩題可能出現的互相干擾，這二題被系統地分離。

調查結果：應答者較強烈同意 創意 (a) 與文化有關, (b) 是持續努力的結果, (c) 人人都有, 並且(d) 一般橫跨許多領域。另一方面，他們不同意，創意與性別和兄弟姊妹誕生次序有關。另有五方面的信念因信度不足而被取消。

總結：由於研究結果的複雜，推動大學生在創意方面的發展需要考慮到他們在信念方面的背景，以便在創意訓練計劃中加強其正確信念，而不正確那些可及早矯正。

關鍵詞： 創意、信念、內隱理論

Introduction

In the ancient time, creativity was seen with awe, associated with myth, and was attributed to heavenly endowment. It is only in the modern time that scientific research attempts at unraveling creativity from mystery. Notwithstanding this, to laymen who are not familiar with the pertinent literature, creativity is still associated with many pet beliefs, unfounded or based on limited personal experiences and observations. For instance, a common disbelief is that creativity is inherited and hence cannot be taught (especially so to those who are endowed with creativity in their own specialized arts). Another instance is that creativity needs to be cultivated young implying that beyond certain age it will not develop. Yet another common belief is that certain ethnic groups are more creative (musical or artistic, especially) than others.

All the above beliefs of lay people are considered to be implicit theories of creativity, containing a combination of cognitive and personality elements (Sternberg, 2003, p.102). They appear to act as prototypes against which behavior is compared, and may be involved while an individual makes a decision about his or her own behavior or the behavior of another (Runco, 1990, p.235). There are three reasons to study such beliefs. Firstly, it serves as a basis of generating explicit theories. Secondly, it is far more likely to affect people's daily interactions. Thirdly, it may differ across culture and social groups, which in turn explain the cultural and social differences in creativity (Sternberg, 2004, p.414, 459).

Antecedents of Beliefs and Perceptions about Creativity

It is the intention of the present study to take a look at possible antecedents of beliefs regarding creativity as such knowledge has implications for education where creativity is concerned. People come to believe about creativity in their own individual ways because of the information they received through reading about it, hearing others' views on it and, of course, thinking about it. Such information may pertain to many questions pertaining to creativity and the list below is not exhaustive, though believed to be essential:

Birth order -- *Are first-borns more creative?*

According to Feldman and Piirto (1994), who studied parenting practices and the development of talented children, among the many aspects of families that make a difference is birth order. Simonton (1996) who studied creative expertise with a life-span development perspective came to the same conclusion. Amabile (1996, p.229, 237) observed a pattern that children who enjoy a special family position (e.g. birth order or other aspects) tend to be more creative.

Critical period— *Is there a time in life beyond which creativity does not develop creativity?*

Albert (1996) stated that the majority of children who show creative potential do not develop so fast after puberty. There seems to be several periods in life that are unusually open to change: the first five years of life (0-5), the early years of adolescence (10-14), early adulthood (18-20), from 29-31, the early forties (40-45), and early sixties (60-65). It appears that the openness diminishes with each succeeding period (Dacey & Lennon, 1998, p.54, 86). This theory thinks that a person's inherent creativity can develop better during a period of crisis and change (Esquivel, 1995; Moukwa, 1995).

Culture—*Is what considered creative in one culture also considered so in another?*

Simonton (1994, 1999) has conducted many studies in different levels of creativity over large time spans in different cultures and find environmental variables such as cultural diversity, war, availability of role models and resources, etc. He found that people from different cultures do not express creativity in the same way and differ in how much they value the creative culture. Hennessey (2003, p.185) revealed the importance of socio-cultural context (political, economic, social and cultural factors) for the shaping of motivation, realization of creative talent, and subsequent creative production.

Effort--*What is the role of effort in creativity?*

Simon and Chase (1973) first found the '10-year rule' on the basis of studies of chess players. The rule says it takes a minimum of 10 years to move from the novice level to the master level in any of the seven fields among Gardner's (1983/1993) 'exemplar creators' such as Albert Einstein (science), Vincent van Gogh (visual art), Igor Stravinsky (Music), etc... Almost without exception, creative people said that they worked considerably harder than the people around them (Dacey & Lennon, 1998, p.56)

Everyone—*Is everybody creative?*

In the early stage of creativity research, some scholars considered it as a higher form of application of intelligence (e.g. Cropley, 1969; Gardner, 1983). Another group considered it as an aspect of day-to-day life of everybody (Nicholls, 1972; Torrance & Myers, 1970). As time goes by, it becomes clear that are the two aspects of creativity: eminent and everyday (or everybody) (Runco and Richards, 1997).

Gender— *Are men are more creative than women?*

When creativity became a research topic in the 1950s, people thought that creative women were scarce. Helson (1990) argued that those early concepts were due to the social world, the individual differences in motivation & early object relations, and to changes in society & the individual over time. In the late 20th Century, there were more female graduates and even more female doctorates while entering the 21st Century. Picariello (1994) found that girls might be more creative in some verbal tasks. However, Milgram (1990, p.224), Amabile (1996, p.78) said that such sex differences were rare. Dacey & Lennon (1998, p.57) found the youth's gender made no significant difference in creativity ratings, but creative teenagers have a strong sense of identification with their mothers.

Domains-- *Is a creative person creative all round?*

A domain-centered analysis challenges the psychometric notion that creativity is an abstract property that some individuals have regardless of their previous experience or the domain that is under consideration. Even creative masters need a significant period of specialized training and practice in a particular cultural domain before they can make any significant breakthrough (Bloom, 1985; Gardner, 1993). If creativity is domain specific, then a choice of creativity training exercises would result only in enhancing creativity in the domains chosen for training exercises, with little or no impact on creativity in other domains. But if generality were in fact true, then

creativity would be improved equally across all domains, even if most of the exercises came from a single domain (Baer & Kaufman, 2005). Even though opinion differences in this area continue, some kind of compromise point must be possible. For example, Plucker (1998) argued for domain generality in the past, but proposed a hybrid approach recently (Plucker & Beghetto, 2004).

Health-- *Are Creative people healthier than others?*

We still need to understand why many eminent creators show some major mood disorder (Andreasen, 1987), but everyday creators appear relatively healthy. Everyday creativity is considered to be an essential part of health, adaptation, growth, and human survival...may be a powerful resilient force. Creative old people may be harder to get sick, and even live a longer life (Runco & Richards, 1997, pp.143, 176-177).

Mystery of creativity-- *Are some people endowed with creativity and others not?*

Creativity has always been associated with mystical beliefs. Creative people are seen as empty vessels into which a divine being mysteriously fill them with inspirations. Often, mystic sources have been suggested in creators' introspective reports (Ghiselin, 1985).
However, studies of whether creativity is inherit or not have yielded contradictory results (Martindale, 1999, p.148).

Group Influence-- *Is creativity an individual phenomenon or group-based?*

Up till the last decade of the 20th Century, it was widely believed that groups should not be used for creativity because of inherent loss in the creative process (Stroebe & Hewstone, 1994). Kasof (1995), taking an attribution perspective in studying creativity, was of the view that it would be a distortion of the development of great creative group to focus on individuals alone. A similar view was expressed by Simonton (1996). Nijstad and Paulus (2003, p.326) assert that creativity is not an individual-level phenomenon, but almost always involves some degree of social interaction, such as evaluation by others, sharing of ideas, and collaboration.

Intelligence and creativity-- *Is a creative person also an intelligent one?*

Getzels and Jackson (1962) compared high-IQ (top 20% in IQ but lowest 20% in creativity) and high-creativity (top 20% in creativity but lowest 20% in IQ) adolescents who differed in IQ by 23 points. They found that those in the high-IQ group were more desirable to their teachers than were the students in the high-creativity group. However, high IQ and creative adolescents were less desirable by their teachers. The relationship between creativity and intelligence is controversial. No one claims that intelligence is a sufficient condition for creativity, although some see it as a necessary one. Creative people tend to show above-average IQs, often above 120. Beyond this threshold, IQ does not seem to matter as much to creativity as it does below 120. The correlation between IQ and creativity is variable, usually ranging from weak to moderate (Sternberg and O-Hara, 2000). Shi (2004, p.340) suggested the reason that some people with high IQs did not have high creative achievement might be this: though they were creative, their intelligence was not expressed in the proper or expected way.

Motivation—*Do creative people need external motivation?*

Creative people are generally curious, complex, sensitive, independent, persistent, venturesome, self-sufficient, imaginative and realistic. Many have a need to create, discover, innovate, pioneer, and to be different…A creative life has a relatively weak need for security and status (Khandwalla, 2004, p.24, 260). Collins and Amabile (1999, p.297) reveal that although creativity can come from complex interaction of motivational forces, motivation that arise from the individual's personal involvement in the work is important for high levels of creativity.

Race—*Are some ethnic groups by nature more creative than others?*

Differences in human success as explained by racial reason are quite controversial. Jews are known to be highly creative in view of the Nobel prizes they won. However, they are not different from other whites genetically but possibly in motivation and expectation (Khandwalla, 2004, p.24, 45). Fish (2002, p.27) concludes there is no evidence that different races differ in innate intelligence but rather that human species has no races.

Admittedly, the 15 aspects selected for this study are far from being exhaustive; other aspects of creativity could be added. However, as alluded to above, common beliefs like these are more often than not based on personal observations and experiences that are limited to specific cases a person comes across with. Such beliefs are therefore circumscribed and biased and may contradict with the findings of scientific research. And, when a society makes an effort to promote creativity among its members, such unfounded or biased beliefs could well be a barrier to the effective development of creativity.

In Hong Kong, Chan (1999) examined the implicit theories of creativity of primary and secondary teachers (N=204) in Hong Kong by asking them to list characteristics of creative and uncreative students. *Imaginative, always questioning, quick in response, active,* and *high intellectual ability* were the most frequently mentioned for creative students. Conversely, the most frequently mentioned characteristics of uncreative students were *conventional, timid, lack of confidence,* and *conformity.*

Rudowicz & Yue (2000) and Yue (2001) combined quantitative and qualitative approaches to study the views of undergraduates (N=451) in Bejing, Guangzhu, Hong Kong, and Taipei. Analysis of the responses identified as core characteristics of creativity include *originality, innovation, thinking, and observational skills, flexibility, willingness to try, self-confidence,* and *imagination*. The researchers found 'artistic' and 'humorous' were missing in the Chinese students' perception of creativity.

Yue and Rudowicz (2002) studied undergraduates (N=489) in Bejing, Guangzhu, Hong Kong, and Taipei about their nomination of most creative Chinese people in history and in modern times. Politicians, followed by scientists and inventors, were returned as the most creative in the past and at present, constituting over 90% of the nominations. Surprisingly, artists, musicians, and businessmen were rarely nominated. The researchers attributed the predominance of politicians, scientists, and inventors to the respondents' strong utilitarian views of creativity and their concern with the creator's social influence or contribution in society than with his innovative thinking. Similar results were obtained by the study of Yue and Ho (2002) collected from primary and secondary

school teachers in Hong Kong (N=264).

The present study attempts at uncovering the beliefs regarding various aspects of creativity among tertiary students in Hong Kong. The implications of the findings for educational efforts in promoting creativity will then be discussed.

Method

Measure

Table 1 shows the 15 aspects of creativity and their corresponding item statements that make up the main body of the questionnaire. For each aspect, only two items were written and both are positively worded (as recent research shows that negatively worded items do not necessarily measure the opposite of positively worded items for the same construct). The small number of items was necessary to keep the questionnaire sufficiently short to maintain respondent interest. The 30 items were presented to the respondents in the form of a series of six-point Likert-type scales, with *Strongly agree* (scored 6) and *Strongly disagree* (scored 1) as the poles. To avoid possible carrying-over effect, the two items for the same aspect were separated systematically, with items for the other aspects intervening.

With two items each, each aspect has the maximum score of 12. For analysis, however, the average for the two relevant items was used so that the final score varied theoretically from one (*Strongly disagree*) to six (*Strongly agree*).

Table 1. Aspects of Creativity and Item Statements

Aspects	Item statements
Birth order	First-born children are more creative than their younger siblings. First-born has an advantage in creativity.
Critical period	There is a time in life beyond which one cannot develop creativity. One must develop creativity before it is too late.
Culture	What is creative in one culture may not be so in another. Creativity is evaluated differently in different cultures.
Effort	Creative work is the outcome of continuous effort. To be creative, one must work persistently.
Everyone	Everybody is creative. Everyone is creative in his own way, more or less.
Gender	Men are more creative than women. Where creativity is concerned, nature favours men.
Generality	A creative person is creative in many fields. Creativity is general, not specific to any fields.
Health	Creative people are healthier than others. Creative people live longer than ordinary people.
Heredity	Creativity is born, not learned. Creativity goes in the family through heredity.
Individuality	Creativity is individual's achievement; group work does not help. A person's creativity can be hampered by group work.
Intelligence	To be creative, one must be intelligent in the first place. Intelligence is a pre-condition of creativity.

Logical thinking	Pushing the frontier of what one knows will lead to creation. Creativity is logical thinking at its extreme.
Motivation	Creative people need no external motivation. Creativity in and of itself is a motivating force.
Race	Creativity is related to ethnicity. Some ethnic groups are by nature more creative than others.
Youth	Young people are more creative. When people get older, they also become less creative.

Respondents

Respondents (N=139) were students from a teacher education institution (67.6%) and a university (32.4%) in Hong Kong. Participation was voluntary and the respondents were assured of anonymity. As the respondents formed a convenient sample (as is true of many studies of similar nature), no representation is claimed. In spite of this, the findings do afford a glimpse into what tertiary students in Hong Kong think about different aspects of creativity and, as will be discussed later, have implications for the development of creative thinking. The distributions of the respondents in terms of the relevant demographic variables are shown in Table 2.

Table 2. Background of the Respondents

		Percentages (N=139)
Sex	Male	41.7
	Female	58.3
Age	Below 22	45.3
	22-25	46.0
	26-29	5.8
	30 and above	2.9
Subject specialization	Bachelor of Arts	24.0
	Bachelor of Science	35.7
	Others	40.3
Programme	Postgraduate Diploma in Education	20.8
	Bachelor Degree	42.3
	Teacher Certificate	36.9

Note: Percentages based on valid information.

Results

Whole sample. Table 3 shows the means for the respondents as a whole. As can be seen therein, four aspects of creativity have mean ratings significantly above the mid-point (3.5) of the six-point scale. This indicates that the respondents agreed more strongly that creativity (a) is dependent of culture, (b) is the result of consistent effort, (c) can be found in everyone, and (d) is general across many fields.

On the other hand, four low mean ratings are below 3, suggesting that the respondents disagreed that creativity has to do with (a) health, (b) race, (c) gender, and (d) birth order. It is of note that these are physiological by nature.

In between these extremes are seven aspects of creativity for which, it can be said, that the respondents were not very sure of their views. These include: (a) young people are more creative, (b)

logical thinking as a process of creativity, (c) the existence of a critical period for the development of creativity, (d) the motivational function of creativity, (e) inheritance of creativity, (f) intelligence as part or pre-requisite of creativity, and, (g) creativity as an individualist nature.

Table 3. Means and Standard Deviations for Aspects of Creativity

Aspects	Means	Standard deviations	Cronbach's Alpha coefficients
Generality	4.46	0.92	.86
Everyone	4.26	1.13	.62
Culture	4.25	0.94	.56
Effort	3.71	0.98	.70
Youth	3.55	1.20	.53
Logical thinking	**3.35**	**0.89**	**.05**
Critical period	3.25	0.91	.27
Motivation	3.24	0.77	.72
Heredity	3.12	0.99	.69
Intelligence	3.09	1.15	.42
Individuality	**3.06**	**0.97**	**.09**
Health	**2.90**	**1.14**	**.16**
Race	**2.61**	**1.15**	**-.45**
Gender	2.32	0.96	.71
Birth order	2.20	1.09	.70

[Perhaps, we should dismiss those aspects where Cronbach's alphas are low (in Bold) from later discussion.]

Also shown in Table 3 are Cronbach's alpha coefficients for the various scales. Some of the coefficients are reasonably high at .70 or above (Generality, Effort, Motivation, Gender and Birth order); some are moderate in the rage of .40 to .69 (Everyone, Culture, Youth, Heredity, and Intelligence). The rest are low (Critical period and Health) or negligible (Logical thinking and individuality). And, the two items for Race are antagonistic to each other and yielded a negative alpha coefficient. The readers are advised to read the findings with due caution especially with regard to these scales with low reliabilities.

Comparisons by Sex. As Table 4 shows, female respondents were more positive about that creativity can be found in everyone, while male respondents were more positive about that creativity depends on gender. Running the risk of making Type 1 error, female respondents who tended to see creativity as dependent on culture just miss the margin of statistical significance (of p= .05). No significant differences were observed for the other aspects.

Table 4. Comparisons by Sex

	Male (N=58)		Female (N=81)			
	Mean	SD	Mean	SD	**t**	**p**
Birth order	2.17	1.14	2.22	1.07	.28	.78
Culture	4.07	1.04	4.23	0.84	1.92	**.06**
Effort	3.70	1.00	3.71	0.98	.04	.97
Everyone	4.03	1.17	4.42	1.08	2.04	**.04**
Gender	2.62	1.01	2.10	0.87	3.26	**.01**
Generality	4.30	1.08	4.56	0.77	1.66	.10
Heredity	3.16	1.08	3.15	0.93	.37	.71
Intelligence	3.12	1.27	3.06	1.06	.33	.75
Motivation	3.11	0.82	3.33	0.73	1.68	.09
Youth	3.74	1.27	3.42	1.40	1.55	.12

Comparisons by Age. The respondents were re-grouped as those below the age of 22 and those aged 22 and above for comparison (Table 5). Significant differences were observed in five aspects. Older respondents were more positive about creativity being dependent on culture; it can be found in everyone; and it cut across different fields. On the other hand, younger respondents were more positive about creativity depending on gender. Views on the other aspects are free from age effect.

Table 5. Comparisons by Age

	Below 22 (N=62)		22 and above (N=63)			
	Mean	SD	Mean	SD		
Birth order	2.20	1.09	2.19	1.11	.06	.96
Culture	4.04	1.00	4.42	0.89	2.26	**.03**
Effort	3.77	0.91	3.66	1.04	.67	.51
Everyone	4.04	1.11	4.55	1.13	2.53	**.01**
Gender	2.49	0.75	2.11	1.23	2.21	**.03**
Generality	4.20	1.02	4.66	0.77	2.85	**.01**
Heredity	3.13	0.96	3.11	1.01	.15	.88
Intelligence	3.05	1.05	3.13	1.20	.40	.69
Motivation	3.19	0.68	3.19	0.83	.02	.98
Youth	3.65	1.11	3.43	1.30	1.00	.32

Comparisons by Subject Specialization. For these, only respondents with either a B.A or B.Sc. degree were compared (Table 6). B.A. respondents were more positive about creativity depending on culture and can be found in everyone. B.Sc. respondents were more positive about the relations between creativity and gender, and can also be seen in heredity.

Table 6. Comparing Subject Specialization

	Arts (N=31)		Science (N=46)			
	Mean	SD	Mean	SD		
Birth order	2.05	1.02	2.15	1.15	.41	.69
Culture	4.36	0.82	3.92	1.00	2.05	**.04**
Effort	3.92	1.39	3.65	0.94	1.09	.28
Everyone	4.36	1.06	3.84	1.12	2.04	**.05**
Gender	2.07	1.11	2.58	0.78	2.38	**.02**
Generality	4.36	0.91	4.26	1.09	.40	.69
Heredity	2.56	1.04	3.21	1.11	2.56	**.01**
Intelligence	3.21	1.10	2.76	1.14	1.72	.09
Motivation	3.02	0.82	3.20	0.70	1.03	.31
Youth	3.37	1.36	3.69	1.16	1.09	2.8

Comparisons by Programmes. One-way ANOVA was run to compare respondents in three different programmes (Table 7). Significant differences among the three programmes were observed for Culture, Everyone, Heredity, and Motivation. Firstly, Teacher Certificate respondents were more positive than Bachelor Degree respondents about creativity depending on cultures and that creativity can be found in everyone, with PGDE respondents coming in between. Next, for Heredity, respondents of three programmes differ significantly, with Teacher Certificate respondents having the highest mean rating, followed by Bachelor Degree respondents, and then PGDE respondents. Although a significant F-test shows significant differences among the three programmes, pair-wise comparisons failed to identify more definitely any group superiority in mean ratings.

Table 7. Comparisons by Qualification

	PGDE (N=27)		Bachelor (55)		Teacher Cert (N=48)			
	Mean	SD	Mean	SD	Mean	SD		
Birth order	2.13	1.22	2.18	1.07	2.29	1.09	.23	.79
Culture	4.35	0.80	3.97*	1.01	4.60*	0.83	6.41	**.01**
Effort	3.68	1.21	3.88	1.01	3.61	0.88	1.00	.37
Everyone	4.26	1.03	3.90*	1.19	4.66*	1.00	6.16	**.01**
Gender	2.47	1.21	2.25	0.86	2.26	0.94	.49	.61

Generality	4.21	0.91	4.26	1.09	4.67	0.71	2.62	.08
Heredity	2.63*+	1.03	3.20*	1.00	3.29+	0.86	4.60	**.01**
Intelligence	3.08	0.93	3.02	1.19	1.80	1.22	.80	.45
Motivation	3.10	0.84	3.12	0.69	3.46	0.76	3.33	**.04**
Youth	3.54	1.14	3.58	1.24	3.58	1.21	.01	.99

* and + denote significant difference ($p<.05$) and ($p<.01$)

Summary and Conclusion

The sample as a whole agreed to a large extent that creativity is general and not specific to any particular field. This implies the existence of a trait of creativity that a person carries with him such that he can be creative in many fields. However, the literature is ambivalent on this. Consistent with the literature, the sample agreed that creativity requires effort. This implies that to become creative, a person should invest resources, time and energy especially. And, a society which aims for creativity needs to provide opportunities for creativity development through setting up training centres for this purpose.

To the sample, the criteria for judging creativity depend on culture and hence what is considered creative in one culture may not be considered so in another. It also agreed that everyone can be creative, suggesting that creativity is not limited to only some people and not others. Of course, this gives rise to the question of how to identify the different levels of creativity. And, this is a challenge to psychometrically oriented creativity researchers, although many research-based instruments for assessing creativity exist.

On the other hand, the respondents held an egalitarian view of creativity whereby creativity is not tied down by birth order, gender, and ethnicity. This is in accord with literature in general. However, contrary to the literature, the respondents did not agree that creativity having a motivating function. This might be due to a Hong Kong youth culture that believes creativity should come from a relaxed atmosphere while working hard will destroy creativity. They also did not agree that creativity is inherited, a view that is close to literature (Martindale, 1999, p.148). Since the relationship between creativity and intelligence is controversial, the respondents' disagreement that creativity requires intelligence is understandable. Moreover, they did not agree that creativity is an individual achievement; this view is in agreement with the recent switch in view of group effect on creativity.

Such beliefs seem to be related to certain demographic variables (Table 8). This is not unexpected as what one believes depends on what one has experienced and exposed to. First, sex-role seems to have a play in the belief that creativity is available to everyone with female respondents agreeing more strongly to this idea, whereas male respondents believe more strongly that creativity depends on gender. These two beliefs are consistent with each other. It will be interesting to find out whether such beliefs are influenced by the respondents' perceptions of their own sex-role in a male-dominance society like Hong Kong. However, sex differences have been diminishing quickly in the last few decades around the world. There are different indications showing that sex difference in Hong Kong is not only smaller than

other parts of Asia, but even more equal than the Western countries.

Table 8. Summary of Comparisons

Aspects	Sex	Age	Subject	Programme
Culture	(Female)	Older	Arts	Certificate
Everyone	Female	Older	Arts	Certificate
Gender	Male	Younger	Science	
Generality		Younger		
Heredity			Science	Certificate
Motivation				(Certificate)

It may not come as a surprise that Arts students believe more strongly that the criteria for judging creativity vary with culture and the creativity is available to everyone since most of the arts subjects are culture-dependent and embrace the concept of multiple intelligence. It also does not seem surprising that Science students believe more strongly that there is gender difference in creativity and heredity of creativity. Such differences in beliefs may well be a reflection of the nature of Arts versus Science as the modes of thinking and perspectives taken by the two types of students differ.

Finally, Teacher Certificate students believe more strongly that culture influences judgment of creativity that is available to everyone but is inherited. This is due to the fact that the training of Teacher Certificate students was just in Education while the other respondents were dispersed in different fields. Education courses teach that culture makes a difference; everyone is teachable but different in talent by birth and motivation is important in learning.

Effective training (in creativity or other fields) begins with where the learners are. Thus, to develop creativity in tertiary students, the trainers need to first have knowledge of the learners' implicit theories of creativity if the training is to be successful. In other words, the trainers need to know what the students believe about creativity so that correct beliefs can be further strengthened and incorrect ones rectified early in the training programmes. .

As this is an exploratory study, further work could be undertaken to include other aspects of explicit theories of creativity such as the nature of the cognitive process underlying creative thinking and how creative products relate to societal norms. Also, from the psychometric point of views, two items for each aspect may be too few and could be expanded to include more items to enhance the reliability, although some of the scales have reasonable high reliabilities. Of theoretical interest, factor analysis could be used to uncover the dimensionality of the aspects for parsimony to enhance understanding the explicit theories of creativity in their inherent structure. For practical purpose, further work could involve tertiary students of different disciplines to establish their respective profiles of beliefs of creativity and check whether the profiles match sufficiently the nature of various fields of study.

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