Science and Belief. A New Approach to Identity and Personality Formation in Early Life

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SuG0801b **1 August 2016**[1]

Summary

This investigation uses the results of a new neurophysiological and psychological study to examine the traditional teaching and doctrines on gender and sexual variation in the Christian Church. The impact of religion is discussed in other papers in this series[2]. It is shown that a contradiction occurs. The neurophysiological and psychological study is the subject of this paper. A rapid transformation which involves a major advancement in neural capabilities occurs at some point between the ages of between one and a half to three years. From this time onwards the pre-frontal cortex of the brain starts to function as a co-ordinated unit. Before this period it is shown that internally driven and contagious physiological development processes described by Gallese, Dawkins, Girard and others take the dominant role. These are compared with the cognitively driven traditional psychodynamic and social learning theories which only come into effect after transformation occurs. Development is characterised by the continuing struggle between these internal, contagious, feed-forward and physiologically driven forces active from early development against the controlling, feed-back and externally moderated processes of cognitive development in later life. Gender dysphoria is used as a case study to link the two processes. Core elements of personality, including basic concepts of gender and sexual identity are shown to form before or during the neural transformation period. These are found to concern identity alone. Characteristics which originate after the transformation have behavioural features which cognitively link desire to reward. Different behaviour and types of conflict are encountered and the impact of these is assessed.

It is demonstrated that brain plasticity (which is the ability of the brain to physically reshape itself), is structured to maximise the amount of information that can be collected during the period before the neural transformation, when it is most needed, and later to ensure that a constancy of personality is formed. It is demonstrated that the physiological, neurological and psychological aspects of brain development act together to form a finely tuned system in which the maximum amount of individuality, possessiveness, intelligence and inquisitiveness, together with the minimum degree of energy expenditure is generated. The results of this neurophysiological and psychological study are compared to the traditional teaching of the Christian Church and it is shown that the same moral standards should be applied to all sexual and cross-gender behaviour, irrespective of the orientations involved.

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[2] This paper is extracted from the second paper in a series on Foundations of Science, Sex and Gender Variation in the Christian Church. For the full series see Gilchrist, S. (2016): "*Foundations of Science, Sex and Gender Variation in the Christian Church*": http://www.tgdr.co.uk/documents/217P-FoundationsSexGender.pdf

Science and Belief. A New Approach to Identity and Personality Formation in Early Life[3]

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SuG0801b **1 August 2016[4]**

1:0 Introduction

1:0:1 Physiological Background

Many approaches to human learning and development tend to assume that cognitive processes at active at all times of life. These processes use the human qualities of reasoning, intuition and perception to examine desires and to justify rewards. The traditional social learning and psychodynamic theories, such as those of Feud, Piaget and others also work on these principles. Many books and treatises are still being produced which presume that these are the only learning processes involved. However during the nineteen seventies advances in neurophysiology began to demonstrate that this was not the only learning mechanism that exists. There are now two that must be considered.

The first comes from inbuilt physiological forces which are present from birth. These forces drive development through internal neural pathways which promote mirror responses, empathy and imitative possession. Development takes place in a contagious and un-co-ordinated manner. This gives it a runaway quality and it can be seen as a feed-forward process which maximises the information obtained. Because of the lack of overall neural co-ordination each of these actions is engaged in an end in itself. The second development mechanism is the cognitive process that is referred to above. This applies the human qualities of reasoning, intuition and perception through the use of feed-back methods to examine the developments and inputs that have occurred. It also tests these processes and enables control to be applied. Not surprisingly there are clashes between these feed-forward and feed-back elements. However the stimulation that their challenges provide drives personal development forward at the maximum achievable rate. The relative rates at which these processes becomes active also has an important role. Once established, both processes remain active throughout life. Most people are unaware of these battles unless a conflict which is generated by them is brought to the conscious mind.

Major consideration must be given to the timing and relative impacts of these two processes during early development. This is because the driving forces behind the neurophysiological development process are active from birth, while those involved in cognitive development have to wait until the brain has developed the capacity to handle them. That capability does not occur before the ages of one and a half to three years. At this time a rapid transformation occurs. This delay means that the overall learning processes which are active before, during

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[4] Revised 1 August: This paper is available online at: http://www.tgdr.co.uk/documents/218P-PaperPersonality.pdf

and after this transformation are very different in character. A major difficulty in previous investigation has been the inability or unwillingness to link the two processes. Some feature is needed to examine what happens before, during and after this neurophysiological transformation occurs.

In principle gender identity could be used for this purpose. However the development of the core gender identity takes place before any conscious awareness can be created. As a consequence this core sense of identity is confined to the subconscious mind. The battles between these two development processes are only likely to come into conscious awareness if some conflict or trauma occurs. When there is no clash between the results of the two development processes they will simply act together to affirm and strengthen the understanding of gender identity created by the later cognitive development. Without such conflict it is considered that no direct evidence for any earlier process will be observed.

Conflict certainly occurs in the case of gender dysphoria, where people develop a sense of gender identity which is contrary to their biological sex. There are some who suggest that the roots of this conflict are present from before birth, but even the results of those who have researched these conditions using social learning theories put the latest date by which the core gender identity has become irrevocably fixed as between the ages of two and three years. This is at or close to the time when the neurophysiological transformation occurs, and research work shows that these two developments are closely linked. This means that gender dysphoria becomes a valid test to model how development proceeds: and that this can be applied before, during and after transformation occurs. This is why gender dysphoria is used in this study. It should also be noted that gender dysphoria is only a specific example of a generally applicable process. Therefore many other characteristics of personality and identity can be formed in a similar way.

The cognitive development processes only become effective after the neurophysiological transformation has taken place. Recent research also suggests that a “Quorum Sensing” mechanism may be involved[5]. This timescale means that the core sense of gender identity is primarily created by the internally driven physiological forces acting on their own. As a consequence the later cognitive development processes, which include the social learning and psychodynamic theories, can only act as overlays on what has already been formed.

A further consequence of this delay is that the conflicts and characteristics which trace their origins from before the transformation period possess considerably different qualities from those which only source their origins from after it. The lack of overall neural co-ordination in the creation of characteristics and conflicts which arise from sources before any cognitive continuum becomes active means that these conflicts and characteristics are identity driven because there is no direct association of desire with reward. A consequence of this is that as wide a range on moral attitudes, beliefs, inclinations and responsibilities are found in these groups, which include gender and sexually variant people, as those which occur in the population at large. This is in contrast to reward driven characteristics and conflicts where behavioural motives are shown to be involved[6]. This additionally means that the moral duality is encountered which demands the welcome of same-sex and gender variant

[5] The easiest explanation to give is to imagine a cloud of little elementary concepts which are randomly milling around. Once some particular focus can be sensed many of the little concepts rush to that scene. The trigger happens when the pathways of the brain link sufficiently together. These elementary core concepts, such as the core gender identity, are then able to form because of the coalescence that has occurred.

[6] Reward driven conflicts rely on cognitive abilities to associate the desire for a goal with the pleasure of the reward. The acknowledgement of distinctions between these reward driven and identity driven types of conflict is not new and in other conditions which require medical intervention, clear distinctions are currently made in the treatment and management methods that are applied. This is discussed more fully later in the paper

relationships that are given in love and faithfulness while condemning those engaged in for abusive and illicit sex. That contrasts with the traditional teaching of the Christian Church, which presumes that all such conflicts must be reward driven and are always in pursuit of immoral and inappropriate sex.

1:0:2 Christian Teaching

This paper deals with the neurophysiological and psychological investigation. The reasons for the contradictions between the science and theology are examined in detail in the additional papers[7]. It is demonstrated that what today is regarded as the traditional teaching of the Christian Church on gender and sexual variation has its origins in the power struggles and cultural clashes between subject and dominant societies. It is the abuse of this power that gives permission for the abuse of sex; and the denial of the duality that is inherent in gender and sexually variant behaviour means that, from the social, scientific and theological points of view, the traditional teaching of the Christian Church on homosexuality and gender and sexual variation cannot be correct. These traditional Christian beliefs come instead from the need to gain respectability in Greco/Roman society. They do not come from the teaching of Jesus himself.

An extended theological analysis has been conducted. New insights are gained by using the results of the neurophysiological and psychological study to remove the armour of the theological presumptions on gender and sexuality, which have dominated both Church and society for the last two thousand years. From the teaching of Jesus it is demonstrated that all gender and sexually variant behaviour is governed by the purity of intention. There is no toleration of abuse. All transgendered, transsexual, lesbian, gay, heterosexual and bisexual people who attempt to live their lives in ways that fulfil the love of Christ, and who seek to express their own identities in roles that are true to themselves must be accepted in their own right.

The results of the theological investigation and the neurophysiological and psychological study are also compared with the social changes in society. From each of the theological, social and scientific standpoints it is established that identical criteria in relation to use and abuse should be applied to heterosexual and same-sex acts of sex. It is also demonstrated that a moral duality is encountered which demands the welcome of cross-gender activities and same-sex relationships which are the outpourings of love and faithfulness, while condemning those that are pursued for abusive and illicit sex. From the neurophysiological and psychological analysis, and from the example and the teaching of Jesus in the New Covenant, it is shown that in all loving and faithful relationships where the dynamics of power are not involved there should be no automatic condemnation of any cross-gender or same-sex act. Instead of centuries of making homosexuality the scapegoat for all sexual abuse, it is demonstrated in this analysis that the correct objectives for the Christian Church should be those of combatting all forms of abusive sex and welcoming all people who live true to their own identities, and seek to follow the Way of Light.

1:0:3 Missed Opportunities

There has been a history of missed opportunities. Homosexuality was first defined in 1869 as a description of identity or orientation only, but the definition soon came to include the behaviour and the relationships between two people who were driven by the desire for

[7] As reported in the Series Preface at the start of this paper.

sexual relationships with other people of the same sex[8]. Today the pressure of history and culture continues to enforce the view that this is a reward driven behaviour in pursuit of sexual desire; and this viewpoint remains strongly endorsed by the Christian Church. The same presumption, that all of these learning processes are cognitively driven, is still found in current literature and scientific research.

1:1 Neurophysiology and Psychology

Since the beginning of the 20th Century psychodynamic and social learning theories developed by Freud, Piaget and others have supplemented the traditional theology of the Church. One feature that these need in common is the existence of a cognitive continuum to work[9]. This requires sufficient neural co-ordination to have developed, so that the capacities of perception, intuition, rewarding and reasoning can be used to link cause to effect. A major transformation in neural processing capabilities takes place at around the age of two years[10]. Before this period development takes place in a fragmented way. The absence of cognition and the disorder that is encountered led the proponents of the psychodynamic and social learning theories to presume that mental development at this time is limited, involving a largely reactive response[11].

That perception is strongly contradicted by the neurophysiological work of Gallese, Girard, Dawkins and others[12] which show that during this first period innate physiologically driven forces impel development by an aggressive and contagious process. In standard psychiatry

[8] The first appearance of the word homosexual in a printed document is found in an 1869 German pamphlet by the Austrian-born novelist Karl-Maria Kertbeny, which was published anonymously. In 1879, Gustav Jäger used Kertbeny's description in his book, Discovery of the Soul (1880). However "homosexuality" as originally defined by Kertbeny simply meant a sexual drive directed toward persons of the same sex. In 1886, Richard von Krafft-Ebing used the terms and distinguished between homosexual and heterosexual in his book Psychopathia Sexualis (1886). Krafft-Ebing's book was so popular among both layman and doctors that the terms "heterosexual" and "homosexual" became the most widely accepted terms for sexual orientation. Krafft-Ebing considered procreation the purpose of sexual desire and that any form of recreational sex was a perversion of the sexual drive. He presented four categories of what he called "cerebral neuroses" in Psychopathia Sexualis. The consequence of this was to expand the definition of homosexuality in popular perception from a term which originally was used to describe identity only, to one which included the desire for and the practice of sexual relationships between two people of the same sex. Freud appears to have been undecided whether or not homosexuality was pathological, expressing different views on this issue at different times and places in his work. The transfer of definition from orientation to relationships is clearly evident in the Catechism of the Roman Catholic Church.

[9] Cognitive ability is the capacity to perform higher mental processes of reasoning, remembering, understanding, and problem solving. Cognitive brain functions require the ability to work with information in a meaningful way, to apply new information to that which has already been gained, perform preferential changes, use reasoned procedures to alter opinions, and to search for rewards. In the cognitive continuum theory, intuition and rational analysis are defined as two modes of cognition or recognition that can be placed at the ends of a continuum, where intuition refers to rapid, unconscious processing and low control, and analysis refers to slow, rational, conscious and controlled thinking. For the latter, sufficient neural co-ordination is required. This investigation demonstrates that the early processes of development, which include intuition and possessive imitation, are physiologically rather than cognitively driven.

[10] This is a rapid transformation which takes place from around one and a half years onwards. Two years is used as the median value.

[11]. Although this was also recognised as a time of seething emotion it was considered too disorganised for major constructive development to take place. For relationships to the Freudian and Piagetian development stages see: Gilchrist, S. (2013d): *"Personality Development and LGB&T People: A New Approach".* Access via: http://www.tgdr.co.uk/articles/index.htm

[12] See for example: Gallese (2003; 2009; 2013); Gallese and Sinigaglia (2011), Girard (1965/1961; 1977/1972); Girard et al. (1987), Dawkins (1989/1978); Decety and Meyer (2008); Dennett (1987); Diamond (2002); Garrels (2006); Heylighen and Chielens (2009).

and psychology the influence of these physiological driving forces is ignored, and a great deal of research and literature is still being produced which assumes that no learning and development can take place without the action of a cognitive continuum at all times of life.

That exclusion is addressed in this analysis. It is demonstrated that the development of personality and self-identity is a dynamic and multifaceted activity which is driven by disparities between these two processes, with their conflicting and opposing sets of demands. Because of its early origins gender dysphoria is used as a case study to link the two elements. Although this analysis focusses on the creation of the core concept of gender identity it can also be taken as a model which demonstrates how all of the other core concepts of identity and personality are created.

Separate neurophysiological stages in the development of core[13] elements of identity and personality are recognised; and a pattern of continuous development can be traced from infancy to adult life. The lifetime tension between the feedforward and adventurous forces of physiology and the feedback and restraining forces of cognition is also shown to provide the stimulation whereby the highest achievements of humanity are obtained.

1:1:1 Neurophysiological Developmental Stages

There are three principal neurophysiological phases involved in early development. The first of these, which lasts up to the age of about two years, is the period when no overall neural co-ordination is present. Development can only take place in a fragmented way because of the absence of the cognitive abilities which allow overall concepts to be formed. Control starts to come into force during the second phase. This begins somewhere around the age of two years, when the rapid increase in neural capabilities takes place and the brain begins to operate as a single co-ordinated unit. It is shown that at this time the core concepts of personality and identity rapidly arise. Quorum sensing methods are believed to be involved[14]. However this can only happen after sufficient neural integration has taken place. Brain plasticity (which is the ability of the brain to physically reshape itself), is shown to be tuned to maximise the amount of information that can be collected before this transformation, at a time when it is most needed, and later to ensure that a constancy of personality is formed. In the third phase this constancy of personality is created.

Development is characterised by continuing and intense struggles between the inbuilt, contagious, internally focussed, feed-forward and physiologically driven forces which are present in infancy against the controlling, feed-back and externally moderated processes of cognitive development in later life. The timing is also crucial. Before the neurophysiological transformation period, development is dominated by the contagious feed-forward processes which maximise the amount of information that can be gained. Management and control are only meaningfully applied after this transformation has taken place. The transition from the first single internally generated process into one in which both processes are involved is delayed until the necessary neural co-ordination has been achieved[15]. It is shown in this analysis that the physiological, neurological and psychological aspects of brain development together form a finely tuned system in which the maximum amount of individuality,

[13] The core identity can be described as a subconscious and basic sense of being who one is. It might only be brought to conscious awareness if some conflict with it occurs.
[14] See footnote 43 for a description
[15] In humans this delay is particularly long. Expert opinion disagrees but it is argued that an extended period is needed to allow the peak human potential to be created. A counter argument against this is that, the more it is delayed, the more it can go wrong.

possessiveness, intelligence and inquisitiveness, together with the minimum degree of energy expenditure is formed.

1:1:2 Intensity and Awareness

The strength and intensity of these conflicts have been more than amply demonstrated by Gallese, Dawkins, Girard and others. However a major feature which acts against their acceptance is that they largely remain hidden from view. These are conflicts which straddle the conscious and subconscious mind. The core senses of personality and identity are shown to have been created before any conscious awareness of them can exist. Because of this the existence of the early development processes, and any core element associated with, it are only likely to erupt into conscious awareness if some trauma which challenges them occurs. A strong bipolarity is found. On the one hand this eruption may lead to conflicts of extreme intensity. On the other the hidden stimulation it gives may affirm and reinforce the senses of identity, personality and motivation which these processes themselves create. When no conflict is found, no awareness need exist of these core elements and the processes by which they were created.

1:1:3 Developmental Advances

Each advance in learning and understanding can be matched to significant advances in the neural capabilities of the brain. At birth the pre-frontal cortex of the brain is still in a primitive state: this is the part of the brain which is responsible for acquiring knowledge by the use of reasoning, intuition or perception to pursue a reward. Development during this early first period has been shown to be dominated by the physiologically internally generated strong and contagious forces predicted by Dawkins, Gallese, Girard and others. These invoke the processes of empathy, possessive imitation and inhibition. Learning and advancement is driven with an intensity which means that the major challenge to be faced is not one of explaining how learning develops, but how it can be managed in an orderly way. The absence of cognitive abilities together with the fragmented nature and the intense momentum created by these physiologically driven forces means that this early development is relatively immune from outside pressures. That includes the expectations of rearing. It is also possible for pre-disposing factors present from birth to have an influence on the outcome that is found. No goals are set. A large amount of poorly co-ordinated learning develops through drives of compulsive acquisition, and the rejection of what is found to be incompatible with the reality that is pursued.

In the second phase, from around the age of two years, the explosion in neural capacity and cognitive ability is associated with the neurophysiological transformation. Distant parts of the brain become linked together and instead of the development of isolated elements, the pre-frontal cortex of the brain begins to work as a single unit. The previously formed fragmented elements of personality and identity coalesce so that core elements of personality and identity are created[16]. It is strongly believed that quorum sensing mechanisms are almost certainly involved in creating the core concepts that are formed. From this time onwards the externally oriented controlling and cognitively based processes of perception, intuition, rewarding and reasoning take an increasingly active role, but the internally driven and contagious physiological forces still remain.

This analysis identifies a third phase, when a constancy of personality is created. That occurs between the age of two and three years. The connections in the pre-frontal cortex of the brain which are more used grow stronger and those which are not die back. This

[16] See sections 2:1:6 onwards for the description

increase in brain order and structure is associated with the "Domestication of the brain" and recent research on this is examined. As a consequence the core elements of personality and identity that have been formed at around the age of two years become permanently and physically locked in place. The same person can be recognised even over gaps on many years, and this gives the constancy of personality which is needed to pursue an ordered life.

A great deal of research on transgender issues has been focussed on determining when the subconscious sense of the gender one belongs to (core gender identity) has become permanently locked in place. Some would argue that this happens due to the influence of pre-natal hormones. However even those who have only used social learning principles to research transgender issues have found that this lock has been permanently applied at the latest between the ages of two and three years. This closely coincides with the time when the neurophysiological transformation occurs. The different learning mechanisms and the neural capabilities which are available during, before and after this transformation are examined. It is shown that the processes which lead up to the creation of the core elements of identity and personality are primarily controlled by the physiologically driven forces acting alone. This means that the social learning and psychodynamic theories can only be used as overlays on what has already been formed.

1:1:4 Coalescence

A common feature in all of the neurophysiological development theories is the principle of coalescence. Development begins with the formation of individual strands of the most basic components. The creation of the more complex features only happens as these coalesce. Cognitive abilities are not present at this time, so the driving mechanisms are dominated by the inbuilt and internally focussed neurophysiological forces instead. Once the interlinking reaches a certain level an accelerated coalescence rapidly takes place. It is believed that a quorum sensing mechanism has become involved and that this is responsible for the more global concepts that are formed. This also means that the more global concepts are most likely to develop during the neurophysiological transformation instead of before it. It has also been noted that there is a close correlation between the development of language and gender association. Both are closely associated with the rapid growth in brain linkages at the time when this neural transformation takes place. These two parameters are taken to be a measure of the coordination that is required.

1:1:5 Conscious Awareness

These formation mechanisms are just one example of a general applicable process. It is argued that many other core aspects of personality and identity develop in the same way. It is also shown that the core elements have become securely fixed by the age of three years. However the rates of development of these features must also compared with the rate at which cognitive awareness forms[17]. That topic is fully considered in this investigation; and it is generally agreed that children do not establish an effective "Theory of Mind" until the age

[17] Consciousness studies are beyond the scope of this article. However present research indicates the similar feed-forward and feed-back processes are involved. The feed-forward elements cone from the sensory inputs received by each person (sight, sound, touch, taste, smell). These are set in order by the feed-back processes associated with the cognitive abilities of the brain. It is argued that conscious perceptions are therefore outcomes of this feed-forward and feed-back process. The effects of neuroplasticity and the tuning of the brain suggest that instant responses will always be in character with the personality that has developed. What might be considered as free will would therefore be a result of this deliberative process: it is not the expression of an instant response. Brain tuning is also global in nature. This suggests that no individual site for consciousness in the brain may exist. For more information on consciousness studies, see for example: Seth, Anil: (2014) and Seth, Anil: (2015)

of about four years[18]. Before that is sufficiently established, children are unable to question any idiosyncrasies about their own development. This age of four years is the age when many transgender people begin to feel discomfort with the gender they are assigned to. By this time it is too late to alter what has already occurred, and ways of managing the discomfort that these have created must be looked for instead.

1:1:6 Conflicts

The large differences in learning capabilities which are available before and after the neural transformation means that two different types of conflict are encountered. It is shown that these should be managed in different ways. Identity driven conflicts arise before the cognitive abilities have developed; they have their focus on identity on its own. With these types of conflict techniques which are akin to the management of alcoholism or depression must be used. The bipolar nature of these identity driven conflicts is examined elsewhere in this investigation and it is shown how they can promote the highest peaks of human achievement, as well as give rise to intense distress[19].

Reward driven conflicts are behaviour motivated. They require the existence of the later cognitive abilities, and they focus on behaviour which associates desire with reward. Although there are many reward driven conflicts which are associated with gender and sexual desire the two types of conflict must be separated. With reward driven conflicts management methods which relate cause to effect can be employed. Because the cognitive continuum is active they are able to use this ability to directly link behaviour to goals and reward.

Accurately identifying the type of conflict is extremely important because the correct methods of managing identity driven conflicts and reward driven conflicts are almost opposite to each other[20]. Even the best intentioned attempts to manage identity driven conflicts as though they are reward driven conflicts can often create severe counterproductive effects. This is where the failure of Church theology occurs. In the traditional Church doctrines and in the psychodynamic and social learning theories it is presumed that only reward driven conflicts can exist. This analysis offers a different perspective but the differing management techniques required for both types of conflict are already well known. However for centuries significant harm has been done, because the wrong methods have been applied

1:1:7 Duality

In the previous sections of this document it is shown that the characteristics and conflicts which arise from sources before any cognitive continuum becomes active are identity driven. This means that as wide a range on moral attitudes, beliefs, inclinations and responsibilities are found in these groups, which include gender and sexually variant groups as those which occur in the population at large. This is in contrast to reward driven characteristics and

[18] Children who can do this are described as having a "Theory of Mind". This involves the ability to attribute mental states: beliefs, intents, desires, pretending, knowledge, etc. to oneself and others and to understand that others have beliefs, desires, intentions, and perspectives that are different from one's own.
[19] Gilchrist, S. (2013): "*A Reassessment of the Traditional Christian Teaching on Homosexuality, Transsexuality and on Gender and Sexual Variation Using a New Neurophysiological and Psychological Approach".* See also sections 3; 5:2-5:3; 6:2-6:3; 8:4 of Gilchrist, S. (2015): *"Personality Development and Gender: Why we should Re-Think the Process".* Access via: http://www.tgdr.co.uk/articles/index.htm
[20] Gilchrist, S. (2013e): "*Management Techniques for Gender Dysphoria with particular reference to Transsexuality":* Access via: http://www.tgdr.co.uk/articles/index.htm

conflicts where behavioural motives are shown to be involved[21]. As a consequence the moral duality is encountered which demands the welcome of same-sex and gender variant relationships that are given in love and faithfulness while condemning those engaged in for abusive and illicit sex. As has previously been noted, that contrasts with the traditional teaching of the Christian Church, which presumes that all such conflicts must be reward driven and are always in pursuit of immoral and inappropriate sex.

1:1:8 Struggles

Far from the development of personality and identity being a peaceful process, it is the outcome of a battle between strong opposing drives. Because of this tension there is an advantage to be gained when it is part of a tuned process, since it enables the greatest possible degrees of individuality and human potential to be created. Without sufficient powers of cognition to check its direction, early development can often be perverse, for it can regard genuine corrections that should be made as obstacles to be overcome; and this further increases the strength of the drive. The dynamics take over and the influence of any original cause may be lost[22]. Typical or atypical gender identities can therefore develop and, from a statistical point of view alone, it is expected that a proportion of people who have gender or sexually variant identities are created without the requirement for any external cause.

1:1:9 Allegiance

This analysis also introduces the concept of allegiance. This develops because of the strength of the internal struggles. There is a roughness in this process. It is argued that individual components are not lost within this coalescence but these remain hidden inside the matrix underneath. This underlying graininess disturbs the coherence of selfhood that is being formed. Identity defines the raw components which drive the conflict. Allegiance is what people are aware of and it evolves from trying to make sense of the disparities which these conflicts create[2324].

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[21] Reward driven conflicts rely on cognitive abilities to associate the desire for a goal with the pleasure of the reward. The acknowledgement of distinctions between these reward driven and identity driven types of conflict is not new and in other conditions which require medical intervention, clear distinctions are currently made in the treatment and management methods that are applied. This is discussed more fully later in the paper

[22] Girard (1965/1961; 1977/1972); Girard et al. (1987)

[23] In the case of children who have developed an atypical sense of core gender identity, the more earnestly they try to embrace the stereotypical tribal behaviour of the gender they are expected to belong to, the greater the discord becomes. At this time tribal divisions become very important and the sense of association or alienation that is created may make their polarisation even more complete. These arguments mean that each person creates an exclusive and polarised gender allegiance, which is either male or female and it is one to which total loyalty is required. The extent of this polarisation is even more marked when transvestite and transsexual behaviour is compared. This is fully discussed in section 5 of: Gilchrist, S. (2015): *"Personality Development and Gender: Why We Should Re-think the Process"*: http://www.tgdr.co.uk/documents/209P-RethinkPaperFull.pdf

[24] It is also of interest to hypothesise. If consciousness is a product of cognition, then the pre-cognitive elements of personality and identity, including the core gender identity form a subconscious stratum upon which the later cognitively created concepts are based. The development of a personal "Theory of Mind" may be seen to represent a point where conscious processing has reached a certain state. The possession of this enables children to make independent judgements on their own thoughts and activities. That ability becomes effective from about the age of for years, and this is the age at which large numbers of transgender people register a discomfort with the gender identity they are expected to possess. For others this only occurs at a later stage, often at puberty or at a time of depression or trauma when the subconscious elements of identity can no longer be suppressed. This is a time when according to Lewis (2015), Baumeister et Al (1998) an "ego deficit" occurs. The conflict can be expressed as one between the need to be true to what the subconscious believes, or the need to be true to what others expect. Many children go through periods of believing they belong to the wrong gender, but for most this is cognitively resolved. For others it is not, and for those who seek to suppress these

1:1:10 Transgender Matters

In this investigation it is shown that the gender identity is just one of the core concepts of personality and identity that are created. It is also demonstrated that the conflicts which are associated with the core elements of personality and gender identity are the symptom of the failure to build a coherent sense of self identity rather than the cause. This is because of the contagious nature of the driving forces and the limited neural co-ordination during the first two years of life. This means that for everyone the development of their own gender identity and allegiance, atypical or not, proceeds in the same way. A consequence is that transsexuals develop a gender allegiance which is contrary to their biological sex, but this is at least as firmly held as those for whom their gender identity and allegiance follow a normal path, indeed it may be argued that the gender allegiance and identity which is felt by transsexuals should be even stronger because it has had to be fought for all along the way. The major structural changes in the brain which take place from around the age of two years physically and permanently lock these in place, so that from this time constant core elements of personality and gender identity are created. However a great variety of individual experiences are encountered. That degree of variation should also be expected from the contagious processes which are involved[25].

Only a summary can be given in this paper. For more information see: Gilchrist, S. (2015): *"Personality Development and Gender: Why we should Re-Think the Process"* and: Gilchrist, S. (2013): "*Personality Development and LGB&T People: A New Approach"*[26].

1:2 Identification

It is often believed by others that the desire of transsexual people is to become a member of the opposite gender. That is often not the driving force: instead of this; the objective is usually one of enabling people to live their lives in ways that are true to their own selves. Finding the right identity is the important feature, not behaviour or sex. For many, the constancy and insistence of the discomfort that is felt with their gender identity has been present from their earliest memories, but for others the awareness of it comes much later in life. There is normally no evidence of any external feature or disruption that could give rise to this condition. Any successful study of the processes that are involved in the development of

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subconscious elements only truces can be found. This struggle between these two elements straddles the conscious and subconscious mind. These development processes are not just concerned with gender. Their dynamics share features with other aspects of early personality development. These characteristics, together with a discussion of their bipolar and specific natures, are fully laid out in the paper: Gilchrist, S. (2015): *"Personality Development and Gender: Why We Should Re-think the Process"*: http://www.tgdr.co.uk/documents/209P-RethinkPaperFull.pdf . Many transsexuals attribute the source of their discomfort to the influence of hormones on the unborn foetus. This investigation does not preclude pre-natal effects or genetic influences but it does not require them. Either way the view that "Transsexuals have been born into the wrong body" is strongly felt: and that may be expected from the nature of this account. Once the genie has come out of the bottle, people may try to find the right way to live with it, but it can never be put back.

[25] These core elements only provide the underlying framework. The influence of brain plasticity and the bipolarity of identity driven conflicts mean that the manifestation of gender discomfort may be delayed to later life. There is a major spurt in brain plasticity at puberty. This is a time when some transsexuals become first aware of the discomfort they face. In addition to this, the bipolar nature of identity driven conflicts means that any conscious sense of alienation can also be hidden. For the full discussion see section 5 of Gilchrist, S. (2015): "*Personality Development and Gender: Why we should Re-Think the Process":* Access via: http://www.tgdr.co.uk/articles/index.htm

[26] Access via: http://www.tgdr.co.uk/articles/index.htm

personality and self-identity for transgender people must be able to explain what transsexual people understand to be the causes of their conditions.

Perhaps the most common understanding is expressed in the belief that the action of hormones on the pre-natal foetus has set the direction of brain development in a way which is contrary to the biological sex. Many transsexuals perceive themselves as being born into the wrong body. Therefore gender reassignment becomes a means of correcting the pre-natal mistake that has occurred. This description does not explain how an initial biological trigger may be transformed into the expression of gender identity. The traditional application of the social learning and psychodynamic theories cannot help: it has already been noted that below the age of two or three years, development takes place in a fragmented way. No overall control or awareness is available during this time and there is no ability to co-ordinate thought. The significance of this is that the mechanisms espoused by the traditional psychodynamic and social learning theories can play little part in the initial formation of the core elements of personality and gender identity. The older psychodynamic and the social learning theories of Money[27] and others likewise fail because the inbuilt physiological forces that are primarily responsible for the creation of the core gender identity were not acknowledged and only the social learning theories were used.

Children do not develop the level of conscious awareness which tell them that anything might be wrong until they reach the age of about four years[28]. Since a core sense of gender identity has been fixed at the latest by about the age of three years there is no initial awareness of any discord that occurs. For some this awareness first appears at the age of four years. Others struggle for years to find the gender identity they should possess. These are battles which straddle the conscious and subconscious mind. It is shown that bipolarity exists and once the genie comes out of the bottle it may be impossible to put it back.

It has been demonstrated that two independent and opposing processes are involved in the creation of a gender identity. For most people, both of these processes will lead to the same sense of gender being created. The core gender identity, acting at the subconscious level simply affirms and strengthens the later cognitive development processes. When there is no disagreement, no conscious evidence for this subconscious element may be found, and the presumptions of the psychodynamic and social learning theories make certain that the possibility of recognising it is denied. The absence of this evidence means that standard texts and accounts are usually written on the presumption that the development of gender identity takes place due to the cognitive influences alone[29].

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[27] Money (1980; 1995); Money and Erhardt (1996)

[28] See section 2:1:5.

[29] In these studies it is shown that, for young children, their initial concepts about gender are quite flexible. They do not begin to notice and to adopt gender-stereotyped behaviour until the age of two or three. A few years later, their concept of gender becomes quite rigid. Before the age of five, children do not seem to think that gender has any permanence. A pre-school child might ask his female teacher whether she was a boy or girl when she was little, or a little boy might say that he wants to grow up to be a mummy. Toddlers think that changing clothes will also change gender. It is not until children understand that boys have penises and girls have vaginas that they know that changing clothes does not change gender. Research suggests that children's concept of gender develops gradually between the ages of three and five. Once children begin to think about gender as a stable trait, they also start to incorporate gender into their own identity. From around that time they become motivated to relate to other members of their group, and to seek out gender-related information, often becoming very strict about adhering to gender stereotypes. When they are between seven and ten years of age children become more relaxed about maintaining these gender stereotypes. This is therefore a process of self-discovery and self-awareness. These require cognitive abilities to be present. Traditional development theories presume that these processes act on a blank canvas, and that gender identity is entirely created through the behaviour predicted by the social learning and psychodynamic development theories. This analysis shows that the elementary core gender identities are created by pre-cognitive processes and that the conscious allegiance to a gender identity is

This means that the evidence for the existence of the subconscious core gender identity only surfaces when conflict between the formation processes occurs. The resulting conflict matches the lived experience of transgender people. For these people the conflict is a battle between the gender identity created through the interaction with others, which is pitched against the identity felt more deeply inside. The idea that all transsexuals are men who want to be women, and vice versa, is false. Many try to fight and suppress these feelings for much of their lives. For a time this may work. However the continual attempts to fight, to change or to suppress the core sense of identity do not succeed and it is the attrition that is caused by the constancy and the insistence of these demands which leads to collapse[30].

1:3 Formation

A great deal has been written about the cognitive processes that are involved in the later creation of personality and self-identity. Most of these presume that they act on a blank canvas. It is shown in this analysis that these processes can only act as overlays on what has already been formed, and that the traditional assumption is incorrect. This analysis illuminates the cognitive mechanisms rather than rejecting them and it does this by establishing the base upon which the future development is built. This section in the account examines in more detail the formation mechanisms that are involved in the creation of this base and on the impact of these features in later life.

1:3:1 Individuality and Contagion

It is demonstrated in this investigation that core concepts of identity and personality do not form until a sufficient degree of neural integration has taken place. Early development is characterised by contagious feed-forward processes, so that once it takes off in a particular direction, it can be difficult to stop. It is also shown that this can take place independently of the expectations of rearing and that the impact of gender reassignment at birth can invoke disrupting effects[31]. These actions happen before any identification with gender can exist. Developing the ability to separate the self from the other is another key feature in the creation of self-identity[32]. Gallese, Girard and Dawkins all show in different ways how these

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the result of a struggle between these subconscious and conscious conflicting demands. Differing elements may dominate at different times. For a summary of these traditional viewpoints see Bue, Vanessa Lo. (2016).

[30] This is fully discussed in: Gilchrist, S. (2015): *"Personality Development and Gender: Why We Should Re-think the Process"*: http://www.tgdr.co.uk/documents/209P-RethinkPaperFull.pdf . Many transsexuals marry in their imposed gender role for all the right reasons and love they possess. However as age increases the drive to transition gets stronger, and if no way is found to manage these dynamics the outcome can be a total, sudden and catastrophic collapse. This can have devastating results. When gender and sexuality are in conflict it is usually gender that wins. There is the destruction of relationships and commitments through the failure to cope, even when love is as strong as ever. There is the blame for letting oneself down, the hurt to other people that has been caused and the guilt for the inability to conform to the edicts of others and one's own expectations. Here too crippling harm can be created by the attitudes of some religious groups who heap guilt on transsexuals who cannot follow the path they prescribe. Further attempts to fight the conflicts only act to destroy the relationships that are sought and to accelerate the demand. The trauma these create can be enormous. Many marriages break up even though the transsexual partner desperately seeks to maintain the relationship, for despite their need to transition they lose nothing of the love that is found in the relationships and commitments they have made.

[31] See section 2:3:3

[32] Gallese writes: "The creation of the individual self-identity arises from the necessity of disentangling the self from the group identity in which it is embedded from the beginning of life" (Gallese et al 2001, 2005, 2009). Therefore the early absence of a discrete boundary between these interpersonal and intrapersonal elements has major implications for the concept of what constitutes self-identity. Collective concepts of self-identity come from being part of a group, part of a family, or part of a tribe. As a consequence the initial differentiation which eventually leads to the adoption of a specific gender identity or core element of personality may not be based on any separate personal concept of self or gender. Instead the development of personality and self-identity can be seen to begin in a collective manner with the tribal associations that are made by and between babies of like mind. This means that the part which makes up the identification of the separate personal self of any individual

precursors form part of the feed-forward, physiologically driven and contagious processes that are involved in early development. Dawkins[33] defined the meme as single strand of thought which competes with others in order to achieve superiority. Successful memes then combine to form memeplexes and these lead to the concepts of self and identity that each person forms. Girard deals directly with tribal formation, while Gallese examines the neurophysiology involved[34]. Neural development is shown to be tuned to ensure that the greatest possible individuality and capability is achieved. It has been noted that the variations and driving forces created by each of these elements are such that, from a statistical point of view alone, it may be expected that a proportion of people who have gender or sexually variant identities are created without the requirement for any external cause.

1:3:2 Hormones and Pre-Natal Influences

The conventional views which are put forward to explain gender and sexual variation attribute their development to the influence of hormones which act before birth[35]. The consequence of this theory is that newly born male and female babies have different perspectives depending on whether or not testosterone has had the required result. According to this explanation the pre-natal brain differentiation is taken to be the determining factor in the development of gender identification. Endocrinal influences may have supplementary effects. However the contagious nature of early development, together with the initially primitive state of the pre-frontal cortex together with the absence of neural integration do not provide the co-ordination that is needed for any meaningful concept of gender to be created. As has been previously noted, the absence of cognitive abilities also means that development at this time can take place independently of the expectations of rearing. However male and female babies have been shown to respond differently to the same external stimuli only hours after they have been born. It is argued that it is these behavioural influences; and it is not any direct association with gender which determines the direction that development takes[36] [37]. Girard has shown that the momentum created by the

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may be much smaller than expected. A major issue concerns not just how the separation of the self from the other is achieved, how it can be implemented, how soon it can occur and how complete it could be. A conscious awareness of the separation of the self from the other is not considered likely to occur before the cognitive processes become active. It is argued that only from this time onwards is it possible to talk meaningfully about any individual awareness of a self-identity being created. See: Gilchrist, S. (2013): *"Personality Development and LGB&T People: A New Approach".* Access via: http://www.tgdr.co.uk/articles/index.htm

[33] Dawkins, R. (1976)

[34] For an overall consideration see: Garrels, S,R: (2006)

[35] See GIRES (2006), GIRES (2012), Besser et al (2006) for a general overview of the present understanding.

[36] See: Gabriel, Paula Stefaneli Ziotti; Formiga, Cibelle, Kayenne; Martins, Roberto; & Linhares, Maria Beatriz Martins. (2013). Also: Boatelle-Costa, E., Costas-Moragas, C., Botet-Mussons, F., Fornieles-Deu, A., & De Cáceres-Zurita, M. L. (2007). Some behaviours may involve the primitive or newborn reflexes, but others can involve attention span and holding length of gaze

[37] Recent work has confirmed sexual differentiation in brain structure and function before birth and in early life. In epigenetic studies on the foetal brain, Spiers et al (2015) shows sex differentiation with highly significant differences in DNA methylation between males and females at a number of autosomal sites (sites relating to a chromosome which is not a sex chromosome), with a small number of regions showing sex-specific DNA methylation trajectories across brain development. Dumais and Veenema (2016) showed that there were sex related differences in the neuropeptides vasopressin (VP) and oxytocin (OT) and their receptors. It is understood that these receptors very often modulate social behaviours in sex-specific ways. Gao et al (2015) aimed to characterize the important developmental process of the brain's functional network architecture during the first 2 years of life. They observed significant sex differences. Boys demonstrated faster network-level connectivity increases among the two frontoparietal networks than girls. These are networks that are crucially involved in the selection of sensory contents by priority and attention. That might be expected to lead to the more rapid identification of behavioural goals and expectations among boys. Forger (2016) takes the view that circumstantial evidence alone suggests that the establishment and maintenance of sex differences in the brain depend on epigenetic modifications of chromatin structure. She points out that more direct evidence has recently been

contagious and self-reinforcing processes of early development produces tribal associations of children of like mind. The core elements of personality and identity are only created after sufficient neural co-ordination has occurred. Even a small trigger may define the direction in which subsequent development occurs, and in this context it is possible for pre-natal influences to have a lasting effect. Once the direction of development has been established the dynamics take over so that the influence and awareness of any cause may be lost.

These processes apply equally to all of the core elements of personality and identity which are eventually created. Therefore the extent of genetic and endocrinal influences is likely to vary between them. In regard to autism for example, genetic and/or endocrinal influences may play a very important role. In the case of gender dysphoria it could be more likely that a pre-disposition is created; and with tribal identity which distinguishes groups of people in society there may be none.

1:3:3 Relative Influences

It is shown in this analysis that development in the pre-cognitive conflicts is driven by the contagion of the dynamics rather than the reaction to any cause. These conflicts are characterised by the rejection of what is wrong instead of a desire for reward. Attempts to control them by searching for a cause is shown to be counterproductive: therefore the appropriate management techniques should concentrate on calming the dynamics instead[38]. The contagious nature of early development also means that there is unlikely to be any single cause for the development of any sexual or gender variant condition. However there are some primary features which are likely to dominate the manner in which they are created.

Two main formation mechanisms are identified. One comes from the momentum created by the intensity of physiologically driven forces that involve the mirror neuron system[39]. The second is due to genetic or endocrinal influences before or near birth. The lack or absence of cognitive abilities means that a third formation mechanism, that of social learning, is limited in its effect. [40] None of these excludes the other[41]. Some indication of the relative influences of the first two processes may come from children who have been assigned or reassigned to a gender at or close to birth[42]. A significant but restricted concordance is found. This indicates that gender reassignment of intersex children should never take place until they are able to decide for themselves what is right.

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obtained from two types of studies: those manipulating a particular epigenetic mechanism, and those examining the genome-wide distribution of specific epigenetic marks. In her view, however, the evidence suggests there is unlikely to be a simple formula for masculine or feminine development of the brain and behaviour. Instead, underlying epigenetic mechanisms may vary by brain region or even by dependent variable within a region. This recent research suggests that, while there various sex differences encountered in foetal and early brain development the individual effects are related to specific features and areas. They do not themselves support the concept of a "male or "female" brain. However they also relate to differentiation is social behaviour. These epigenetic influences might promote the development of neural pathways in gender related ways.

[38] Gilchrist, S. (2015a): "*Personality Development and Gender: Why We Should Re-think the Process*": http://www.tgdr.co.uk/documents/209P-RethinkPaperFull.pdf and Gilchrist, S. (2013e): "*Management Techniques for Gender Dysphoria with Particular Reference to Transsexuality":* http://www.tgdr.co.uk/documents/205P-ManagementTechniquesInGenderDysphoria.pdf

[39] Cattaneo and Rizzolatti (2009); Iacoboni and Geffen (2009); Keysers and Fadiga (2008); Rizzolatti and Fabbri-Destro (2010).

[40] Kerlin (2004); Meriggiola and Gava (2015); Minot Presentation (2005); Rosenthal (2014).

[41] There is currently intense discussion about the relative importance of nature versus nurture and the extent to which genetic and endocrinal influences are involved. This analysis allows for these, but it does not require it.

[42] Dessens et al (2005); Diamond and Sigmundson (1997); Diamond and Watson (2004); Kipnis and Diamond (1998); Ochoa (1998); Reiner (2004).

In all cases it is demonstrated that quorum sensing methods may be primarily responsible for creating the core gender identity[43]. This means that identities are set by the direction the process has taken; they are not the product of cognitive thought. Although different formation processes may be precursors to the creation of the core senses of self-identity they all lead to the same result. Awareness of the conflicts between the conflicting expectations that are created by the divergent identity driven and later reward driven development processes can only begin to appear after there is sufficient neural co-ordination to allow the core senses of identity and a "Theory of Mind" to develop. For individual people these conflicts have always existed and it is understandable for them to believe that they have always been present from birth.

1:3:4 Constancies of Personality and Later Development

Brain plasticity and permeability[44] extends throughout life. These are increasingly being recognised as always having a fundamental part to play in the development of human identity, personality and capability. However it should also be noted that in different neural regions, brain plasticity peaks at different times[45]. In puberty brain plasticity and permeability greatly increases. During this period considerable changes in personality can occur. If they have not already done so, this is a time when many gender and sexually variant people first become aware of their conditions.

However these developments must also be seen in the context of the now gradual, but still continuing decrease in the number of brain interconnections[46]. This decrease is counter-intuitive but it arises because the increasing brain organisation means that those neural pathways which are no longer needed die back. The degree of re-organisation may also be large. This overall number of brain interconnections drops from the peak value of one and a half to twice the adult value during the ages of between two and three years. That peak coincides with the time when the core elements of personality are formed. Even though many pathways die back, there are massive increases in the other pathways in the brain which correspond to the development of new skills and abilities.

This type of process has been described as the "Domestication of the brain" and where it occurs, smaller brain sizes are found[47]. This net reduction is considered in this analysis to be a consequence of the tuning of the brain in which these later developments are refinements

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[43] Quorum Sensing is encountered when separate entities find ways to communicate with others to pursue a common purpose. Much research is now carried out on communication in bacteria colonies and the creation of artificial neural networks, where particle swarm optimisation techniques may be used. Mechanisms similar to quorum sensing can also be observed in colonies of ants and bees. It is similar to crowd behaviour at a time when a point of interest is found. That point must be big enough to attract attention, but once that is gained (the quorum) all the other elements who are nearby rapidly join in. In this analysis it is considered that the same thing happens at the time when the individual global elements that are used to make up the core senses of identity and personality can first combine. That is associated with the rapid and large increase in neural interconnectivity which takes place in the brain at around the age of two years. See: Gilchrist, S. (2013): *"Personality Development and LGB&T People: A New Approach".* Access via: http://www.tgdr.co.uk/articles/index.htm

[44] The ability of the wiring and the physical structure of the brain to change in response to external inputs

[45] The large changes and increases in brain plasticity which can take place during these peak times contrasts with the relatively limited changes outside them. The peak period of brain plasticity of the pre-frontal cortex, which is the area of the brain responsible for acquiring knowledge by the use of reasoning, intuition or perception occurs between one and a half to three years. Language skills and personal identification, including that of gender, are closely associated with this period. For a more complete and extended discussion see: Gilchrist, S. (2015): "*Personality Development and Gender: Why we should Re-Think the Process":* and Gilchrist, S. (2013): *"Personality Development and LGB&T People: A New Approach".* Access via: http://www.tgdr.co.uk/articles/index.htm

[46] As measured in terms of synaptic density.

[47] For an introduction see: Hood, Bruce: (2014)

and adaptations of the brain to meet the current needs and circumstances, without removing the underlying sub-stratum of core elements of personality and identity that had been locked in place not later than the ages of two and three years. There are other indicators for this development pattern. Plasticity peaks in different areas of the brain at different times. In early development the peak period of brain plasticity for the pre-frontal cortex occurs from about one and a half years of age to three years. During this period an explosion in linguistic capabilities takes place. Language learning capabilities are greatly accentuated inside this period but outside this time they are considerably reduced. The impact of this is seen when a foreign language is learned: deficiencies will be found if the learning takes place after this peak period. This has a lifetime impact. Various investigators have indicated that the development of gender associations and language capabilities are closely linked. If that argument is followed it affirms the experience which shows that the core sense of gender identity by this time has been permanently established.

The human brain has shrunk by about ten percent in the last twenty millennia and there must be little doubt that its domestication has taken place[48]. However an additional issue is one of determining the impact this creates in everyday life. The lived experience of transgender people may be relevant. In section 1:2 that is described. For these people, the conflict is often seen as a battle between their gender identity that is created through their interaction with others, against the core identity each person feels deeply inside. Many try to fight and suppress the deeper feeling for much of their lives. There is a bipolar element to these conflicts: at times suppression may succeed but the discord may erupt into conscious awareness at any time. The demand gets stronger as age increases. Attempts to fight, to change or to suppress the core sense of identity do not succeed and it is the attrition that is caused by the constancy and the insistence of these demands which leads to collapse[49].

It is argued in this investigation that transgender experiences should not be treated in isolation; and that the core gender identity is just one of the many such elements that are formed. It is through the action of all of these elements that the base for a constancy of personality is created. The permanence of this is such that only a stroke, tumour, dementia or other physical brain damage can cause the personality to change. The stability given by brain domestication is considered to set the direction for the continued development of neural capabilities and for the flowering and development of personality and identity which later occurs. Transsexuals either need to seek gender reassignment, or find ways to live with this conflict for the rest of their lives.

1:4 Knowledge and Interpretation

The traditional understanding of gender and sexuality has been determined by the theology of the Christian Church in a period of development lasting for some 2000 years. At the beginning of the 20th century psychodynamic and social learning theories came into prominence with the work of Freud and others[50]. About 50 years later research work on the neurophysiological processes that are involved in the development of personality and identity began to take effect. However amongst many practitioners and research workers the existence of this neurophysiological research work has been totally ignored. That disregard may in part be because of a suitable case study to link the two processes. However the use

[48] Over the past 20,000 years, the average volume of the human male brain has decreased from 1,500 cubic centimetres to 1,350 cc, which is about a tennis ball in size.
[49] This is fully discussed in: Gilchrist, S. (2015): *"Personality Development and Gender: Why We Should Re-think the Process"*: http://www.tgdr.co.uk/documents/209P-RethinkPaperFull.pdf .
[50] See for example: Freud 1933; (1905/1915); Gruber and Voneche, Ed (1977); Strachey, Ed (1949/1994).

of gender dysphoria in this study here deals with that situation. Another reason may be the resistance created by the cultural values ingrained into society by 2000 years of domination by the theology of the Church.

What stands out in this examination is the contrast between the results of the different theories. The neurophysiological study predicts a physiological duality which is identified by the differences in behaviour between identity driven and reward driven conflicts and also a moral duality which requires the welcome of relationships given in love and faithfulness while condemning those engaged in for abusive and illicit sex. By denying that moral duality the traditional teaching of the Church always condemns all forms of gender and sexually variant behaviour as being heinous sins and illicit and immoral acts. The possibility that gender and sexually variant behaviour could be engaged in for the best of motives is denied by this theological approach.

Today a great deal of research is still being undertaken and literature is being written which relies exclusively on the psychodynamic and social learning theories to interpret their results. These also make the assumption that no other processes are involved. This analysis has shown that this assumption is incorrect. It is demonstrated that the social learning and psychodynamic theories are invalid if they are used to identify the processes that lead up to the creation of the core elements of identity and personality, but they can still act as overlays on what has already been formed.

For everybody all of the core elements of identity and personality are formed in the same way. With this analysis it becomes possible to identify a continuous process of identity and personality development for all people which extends from infancy into adult life.

1:5 Implications

The investigation which is reported in this account combines the traditional psychodynamic and social learning development theories with the neurophysiological theories developed by Girard, Dawkins, Gallese and others. A major neurological transformation rapidly occurs around the age of two years when the pre-frontal cortex of the brain begins to function as an integrated unit. There is a rapid increase in reasoning and learning capabilities during this transformation period. Before that time it is shown that development takes place in a fragmented way. This is dominated by the internally generated physiological driving forces in a contagious feed-forward drive which maximises the information gained but with the lack of cognition, little order and control is applied. That order and control develops from the neurophysiological transformation period onwards when the brain begins to be able to use the cognitive capacities of reasoning, perception intuition and feed-back to examine and manage the core concepts of identity and personality which have previously been formed. Gender dysphoria is used to examine these development processes. It is shown that the core sense of gender identity forms at or before the time when this neurophysiological transformation takes place. This means that gender identity develops in two ways. Up to the point of the neurophysiological transformation it is argued that only fragmented concepts are created and tribal associations are formed. It is the increased co-ordination at the time of transition enables the subconscious sense of core gender identity to be created. As a consequence the direction which is taken is determined by the momentum of the development processes. It is not a logical choice and it is considered that quorum sensing methods are involved. The focus in early development will have an internally looking perspective because of the lack of cognition and the inbuilt nature of the driving forces that

create it. That contrasts with the outward looking perspective which becomes possible after the transformation period has passed. In this later period the conscious perception of gender identity develops through the interaction with others and from the expectations of adults and others that are imposed on the infants themselves.

When gender develops as expected these two processes will be in agreement. When they disagree major conflict may be expected to occur. There are also issues of awareness to be considered. The core elements of personality and identity which are formed at the subconscious level are not likely to erupt into consciousness unless some conflict occurs. When the two processes are in agreement no awareness of the subconscious elements need arise since the subconscious will simply support, affirm and enhance the conscious sense of gender identity that has been created. When they are in conflict these subconscious elements can erupt into conscious awareness, and intense conflict may occur. The physiological development and domestication of the brain also locks these core elements in place so that fighting them does not succeed. Therefore ways must be sought to manage them instead.

A major failure of the traditional psychodynamic and social learning theories is their inability or unwillingness to recognise the earlier non-cognitive development processes which have already taken place. This means that the psychodynamic and social learning theories can only act as overlays on what has already been formed[51]. This is instead of the blank canvas that is normally assumed. One of the major factors which may inhibit their recognition arises because unless some conflict occurs, they are not likely to reach the conscious mind. Another is the theology of the Church, which condemns all forms of gender and sexually variant behaviour, irrespective of purpose, as intrinsically sinful and evil acts.

This article focusses on the development of personality and self-identity up to the age of four years. By this point the cognitive influences have become strongly established and, within the requirements above, the traditional psychodynamic and social learning theories may be used. In separate work which the author is engaged in, the theories put forward by Girard by example are applied. Here the cognitive processes are fully considered. It is of interest to note how these theories can accommodate the results of the neurophysiological studies. Social learning theories are the least effective since by definition they demand a cognitive approach. Freud recognised the need for a strong driving force to propel development and he chose sexuality for the purpose. However he also identified a need to recover repressed memories, and that required listening to the inner mind. It is of note that Freud divided what he saw as diversions into two distinct sections, one is that of deviation where the issue of concern has always been present, and the other is perversion (used in then non pejorative sense) where disruption from a normal development pattern occurs. These have some parallel characteristics to the identity driven and reward driven conflicts described in this analysis. To some degree Freud was ambivalent. However Freud's work is interpreted by his followers as being applied to cognitively guided process at all times. Girard replaced Freud's driving mechanism with one of possessive imitation, which he observed in the behaviour of very young children. He also described the contagious nature of the dynamics involved in the development process. In this respect his interpretation of the driving mechanism comes much closer to that identified by the neurophysiological studies: indeed he anticipated this work to a remarkable extent. However Girard also sought to place all of these development processes in a cognitive context. While that is relevant for later development, it does not allow for the non-cognitive processes that dominate early life. This analysis embraces in full

[51] A more extended account is given in: Gilchrist, S. (2015): "*Personality Development and Gender: Why We Should Re-think the Process*": http://www.tgdr.co.uk/documents/209P-RethinkPaperFull.pdf, where the full impact of this analysis is reviewed

the results of the neurophysiological studies, (of which possessive imitation is an important component), and it examines the early non-cognitive development processes. Freud chose to use sexuality as the driving force for his psychodynamic theories because it was the best that was available to him at the time. However if Freud has access to the knowledge which is available in the present day, one wonders what his conclusions might now become.

There are a number of consequences which arise from this analysis. The first is the need to revise the understanding of early development to take account of both of the development processes that are involved, and the nature of the transition between them. The second is to make use of the traditional psychodynamic and social learning theories in ways which recognise that these are overlays on what has already been formed, instead of being complete on their own. The third is to acknowledge the distinctions between reward driven and identity driven conflicts, including the differences in the behaviour they promote. The fourth is to recognise the duality in gender and sexually variant behaviour. The fifth is to challenge the misuse its denial creates through the scapegoating of all gender and sexually variant people by secular society and by the Christian Church.

This investigation began as part of a collaborative study on the development of self and tribal identities in societies where communal tribal violence occurs. The investigation illuminates rather than rejects the psychodynamic theories of Girard, Freud and others. There is continuity in this analysis between the early development theories which are here reported, and the ways in which the psychodynamic theories of Girard can be applied to later life. It is also noted that gender dysphoria is only a specific example of a generally applicable process. Many other characteristics of personality and identity can be formed in a similar way. Studies on the later development are beyond the scope of this article; however the linkages that are here provided give reason for concluding that from the results of this investigation it is now possible to trace a continuous process of identity and personality development which extends from infancy through adult life.

Religion and Science take complementary approaches. Science works on the basis of certainty and from the bottom up. Religion addresses the needs of society from the top down where the principles of faith are applied in the full awareness of doubt. The contradiction between the results of the neurophysiological and psychological study is the result of a clash between the religious and scientific traditions. Belief in each of these is strongly held and the result of this has been increasing conflict between the two sides. The stereotypes which have been created have become increasingly divorced from reality. It is not just the Christian Church which has been hindered by this. The progress of science has similarly been impeded: not least in developing the understanding of how self-identity and personality are formed. If humanity is greatly enhanced by advancement of science, it is greatly diminished by the failure of religion to think beyond a literal or dogmatic approach.

This paper is extracted from the second paper in a series on Foundations of Science, Sex and Gender Variation in the Christian Church[52].The remaining three papers in this series concentrate on examining how the Christian traditions have developed, and their influence on the present day world[53]. These analyses make no presumptions about the truths or

[52] For the full series see Gilchrist, S. (2016): "*Foundations of Science, Sex and Gender Variation in the Christian Church"*: http://www.tgdr.co.uk/documents/217P-FoundationsSexGender.pdf

[53] Paper 3 is: Gilchrist, S. (2016):"*Influences of Gender and Sexual Variation on the Life and Teaching of Jesus*": http://www.tgdr.co.uk/documents/219P-InfluencesJesus.pdf . Paper 4 is: Gilchrist, S. (2016f): "*Influences of Gender and Sexual Variation in the History and Traditions of the Christian Church":* http://www.tgdr.co.uk/documents/220P-InfluencesChurch.pdf . Paper 5 is: Gilchrist, S. (2016*): "The Perceptions of Gender and Sexual Variation in Present Day Society and in the Modern Christian Church":* http://www.tgdr.co.uk/documents/221P-InfluencesToday.pdf .

otherwise of religious creeds. The intention of all of these papers is provide a fuller understanding of how religion and science should together make better contributions to the valuing of human life.

This Paper is available online at: Gilchrist, S. (2016*): "A New Approach to Identity and Personality Formation in Early Life"*: http://www.tgdr.co.uk/documents/218P-PaperPersonality.pdf

Notes for this paper are posted on: http://www.tgdr.co.uk/notes218P

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1:6 Select Bibliography

Anglican Mainstream (2016): *"32 Synod delegates publicly express "lack of confidence" in C of E Shared Conversations process"* [accessed 20 July 2016]: http://anglicanmainstream.org/32-evangelicals-publicly-express-lack-of-confidence-in-c-of-e-shared-conversations-process/

Baumeister, R. F.; Bratslavsky, E.; Muraven, M.; Tice, D. M. (1998). "Ego depletion: Is the active self a limited resource?". *Journal of Personality and Social Psychology* **74** (5): 1252–1265. doi:10.1037/0022-3514.74.5.1252.PMID 9599441 [Last Accessed 12 July 2016]: https://www.psychologytoday.com/files/attachments/584/baumeisteretal1998.pdf

Besser, M., Carr, S., Cohen-Kettenis, P.T., Connolly, P., De Sutter, P., Diamond, M., Di Ceglie, D. (Ch and Adol.), Higashi, Y., Jones, L., Kruijver. F.P.M., Martin, J., Playdon, Z-J., Ralph, D., Reed, T., Reid, R., Reiner, W.G., Swaab, D., Terry, T., Wilson, P. and Wylie, K. (2006) 'Atypical Gender Development – A Review', *International Journal of Transgenderism,* 9(1):29-44, [Accessed 15/10/2015]: http://www.gires.org.uk/assets/Research-Assets/atypical-gender-development.pdfCatechism (1997) *Catechism of the Catholic Church*, Homebush, NSW, Strathfield: Pauline Books

Boatelle-Costa, E., Costas-Moragas, C., Botet-Mussons, F., Fornieles-Deu, A., & De Cáceres-Zurita, M. L. (2007). "Behavioral gender differences in the neonatal period according to the Brazelton Scale". *Early Human Development, 83*(2), 91-97.

Bue, Vanessa Lo. (2016): *"When do children develop their gender identity".* Rutgers University Newark: [Accessed 11 July 2016]: http://theconversation.com/when-do-children-develop-their-gender-identity-56480

Catechism (1997) *Catechism of the Catholic Church*, Homebush, NSW, Strathfield: Pauline Books

Cattaneo, L. and Rizzolatti, G. (2009) 'The mirror neuron system', *Arch Neurol,* 66(5): 557-60.

Church of England (2015) Grace and Disagreement article: Grace and Disagreement Shared Conversations on Scripture, Mission and Human Sexuality: [Accessed 15/10/2015]: https://churchofengland.org/media/2165248/grace2.pdf .

Church of England (2015) Shared Conversations Website: [Online]. [Accessed 15/10/2015]: http://www.sharedconversations.org/

Church of England. (2016*): "Statement following conclusion of Shared Conversations Process*": Church of England Website [Accessed 19 July 2016] https://www.churchofengland.org/media-centre/news/2016/07/statement-following-conclusion-of-shared-conversations-process.aspx

Davies, Madeleine. (2016): Synod members thanked for staying on to talk about their differences"; *Church Times. Web* Posted: 12 Jul 2016 @ 06:28https://www.churchtimes.co.uk/articles/2016/15-july/news/uk/synod-members-thanked-for-staying-on-to-talk-about-their-differences

Dawkins, R. (1989/1978) *The Selfish Gene*, Oxford University Press. 3rd edition 2006

Decety, J. and Meyer, M. (2008) 'From emotion resonance to empathic understanding: A social developmental neuroscience account'. *Development and Psychopathology*, 20: 1053-1080.

Dennett, D.C. (1987) 'Reprint of Intentional systems in cognitive ethology: The Panglossian paradigm defended', *The Brain and Behavioral Sciences*, 6: 343-390.

Dessens, A.B. Froukje, M.E., Slijper, F.M.E. Stenvert, L.S. and Drop S.L.S. (2005) 'Gender dysphoria and gender change in chromosomal females with congenital adrenal hyperplasia', *Archives of Sexual Behavior* 34(4): 389–397.

Diamond, A. (2002) 'Prefrontal Cortex Development and Development of Cognitive Function', in *International Encyclopedia of the Social and Behavioral Sciences*: 11976–11982

Diamond, M. and Sigmundson H.K. (1997) 'Sex reassignment at birth. Long term review and clinical implications', *Archives of Pediatrics and Adolescent Medicine* 151: 298-304.

Diamond, M. and Watson, L.A. (2004). 'Androgen insensitivity syndrome and Klinefelter's Syndrome', in Diamond, M. and Yates, A. (eds.) *Child and Adolescent Psychiatric Clinics of North America (Sex and Gender)*, Philadelphia: W.B. Saunders, 13(3): 623–640.

Dumais, Kelly M: Veenema, Alexa H: (2016): "Vasopressin and oxytocin receptor systems in the brain: Sex differences and sex-specific regulation of social behavior": *Frontiers in Neuroendocrinology* Volume 40, January 2016, Pages 1–23 [Accessed 24/4/2016] http://www.sciencedirect.com/science/article/pii/S0091302215000278

Forger, Nancy G. (2016): "Epigenetic mechanisms in sexual differentiation of the brain and behaviour" *The Royal Society Trans B:* Print ISSN 0962-8436 Online ISSN 1471-2970. [Accessed 24/4/2016] http://dx.doi.org/10.1098/rstb.2015.0114

Freud, S. (1905/1915). 'Three Essays on the Theory of Sexuality', in *The Standard Edition of the Complete Psychological Works of Sigmund Freud, Volume VII (1901-1905)*, Hogarth Press: 123-246.

Freud, S. (1933/1991). *New Introductory Lectures on Psychoanalysis*, Penguin Books.

Gabriel, Paula Stefaneli Ziotti; Formiga, Cibelle, Kayenne; Martins, Roberto; & Linhares, Maria Beatriz Martins. (2013). “Early neurobehavioral development of preterm infants”. *Psicologia: Reflexão e Crítica*, *26*(1), 202-211.https://dx.doi.org/10.1590/S0102-79722013000100022 [Accessed 2may 2016].

Gallese, V. (2001) The “Shared Manifold” hypothesis: from mirror neurons to empathy. *Journal of Consciousness Studies*, 8, 33-50

Gallese, V. (2003) 'The Roots of Empathy: The Shared Manifold Hypothesis and the Neural Basis of Intersubjectivity', *Psychopathology,* 36(4): 171–180.

Gallese, Vittorio, Lakoff, George. (2005) “The Brain’s Concepts: The Role Of The Sensory-Motor System In Conceptual Knowledge”. *Cognitive Neuropsychology*, 2005, 21

Gallese, V. (2009) 'The Two Sides of Mimesis Girard's Mimetic Theory, Embodied Simulation and Social Identification', *Journal of Consciousness studies*, 16, No 4.

Gallese, V. and Sinigaglia, C. (2011) 'How the body in action shapes the self', *Journal of Consciousness Studies,* 18((7–8): 117–143.

Gallese, V. (2013) 'Bodily self, affect, consciousness and the cortex', *Neuropsychoanalysis,* 15(1): 42-45.

Garrels, S.R. (2006) 'Imitation, Mirror Neurons, and Mimetic Desire: Convergence Between The Mimetic Theory of Rene Girard and Empirical Research on Imitation Contagion', Journal of Violence, mimesis and Culture, 12-13, 2006: 47-86

Gilchrist, S. (2016) *Taking a Different Path*: Chapter 10 in: "This Is My Body: Hearing the Theology of Transgender Christians", Ed: Beardsley, T. and O'Brien, M: Darton Longman and Todd. Publication date: May 2016 http://www.tgdr.co.uk/notes210P/index.htm

Gilchrist, S. (2016): *"An Introduction to the Foundations of Science, Sex and Gender Variation in the Christian Church*: http://www.tgdr.co.uk/documents/211P-IntroFoundationsSexGender.pdf

Gilchrist, S. (2016): "*Foundations of Science, Sex and Gender Variation in the Christian Church"*: http://www.tgdr.co.uk/documents/217P-FoundationsSexGender.pdf

Gilchrist, S. (2016*): "The Perceptions of Gender and Sexual Variation in Present Day Society and in the Modern Christian Church":* http://www.tgdr.co.uk/documents/221P-InfluencesToday.pdf

Gilchrist, S. (2016): "*Influences of Gender and Sexual Variation in the History and Traditions of the Christian Church":* http://www.tgdr.co.uk/documents/220P-InfluencesChurch.pdf

Gilchrist, S. (2016):"*Influences of Gender and Sexual Variation on the Life and Teaching of Jesus*": http://www.tgdr.co.uk/documents/219P-InfluencesJesus.pdf

Gilchrist, S. (2016*): "A New Approach to Identity and Personality Formation in Early Life"*: http://www.tgdr.co.uk/documents/218P-InfluencesPersonality.pdf

Gilchrist, S. (2015): "*Personality Development and Gender: Why We Should Re-think the Process"*: http://www.tgdr.co.uk/documents/209P-RethinkPaperFull.pdf

Gilchrist, S. (2015): "*Deuteronomy 22:5 and its Impact on Gender and Sexual Variation in the Christian Church":* http://www.tgdr.co.uk/documents/022B-Deuteronomy22-5.pdf

Gilchrist, S. (2013): "*A Reassessment of the Traditional Christian Teaching on Homosexuality, Transsexuality and on Gender and Sexual Variation Using a New Neurophysiological and Psychological Approach"*: http://www.tgdr.co.uk/documents/207P-ReassessmentPsychologyExtended.pdf

Gilchrist, S. (2013): *"Personality Development and LGB&T People: A New Approach".* : http://www.tgdr.co.uk/documents/201P-PersonalityDevelopmentAndLGBTPeople.pdf

Gilchrist, S. (2013): "*Management Techniques for Gender Dysphoria with particular reference to Transsexuality":* http://www.tgdr.co.uk/documents/205P-ManagementTechniquesInGenderDysphoria.pdf

Girard, R. (1965/1961) *Deceit, Desire, and the Novel: Self and Other in Literary Structure*, Baltimore: Johns Hopkins University Press.

Girard, R. (1977/1972) *Violence and the Sacred*, Baltimore: Johns Hopkins University Press.

Girard, R., Oughourlian, J.-M. and Lefort, G. (1987) *Things Hidden since the Foundation of the World*, Stanford CA: Stanford University Press.

GIRES (2006) 'Atypical Gender Development: A critique of the review', [Online]. [Accessed 15/10/2015]: http://www.gires.org.uk/assets/IJT-Assets/IJTresponse.pdf

GIRES (2012) 'Diagnosis and Aetiology: an update', [Online]. [Accessed 15/10/2015]: http://www.gires.org.uk/assets/Research-Assets/Diagnosis%20and%20Aetiology%20update%202012.pdf

Gao, Wei: Alcauter, Sarael: Smith, J. Keith: Gilmore, John H: Lin. Weili: (2015): "Development of human brain cortical network architecture during infancy" *Brain Structure and Function* March 2015, Volume 220, Issue 2, pp 1173-1186 https://www.researchgate.net/profile/Wei_Gao14/publication/259956059_Development_of_human_brain_cortical_network_architecture_during_infancy/links/01086534fd6880fcdc000000.pdf

Garrels, S,R. (2006) Imitation, Mirror Neurons, and Mimetic Desire: Convergence Between The Mimetic Theory of Rene Girard and Empirical Research on Imitation Contagion: Journal of Violence, Mimesis and Culture Vol 12-13, 2006 pp 47-86 ISSN 1075-7201

Gruber, H.E. and Voneche, J.J. eds. (1977) *The Essential Piaget*, New York: Basic Books.

Heylighen, F. and Chielens, K. (2009) 'Evolution of Culture, Memetics', in B. Meyers (ed.) *Encyclopedia of Complexity and Systems Science*, Springer [Accessed 15/10/2015]: http://pespmc1.vub.ac.be/Papers/Memetics-Springer.pdf

Hood, Bruce: (2014): *"The Domesticated Brain: A Pelican Introduction":* ISBN-10: 0141974869 ISBN-13: 978-0141974866

Iacoboni, M. and Geffen, D. (2009), 'Imitation, Empathy and Mirror Neurons', *Annual Review of Psychology* 60: 653-670

Joela, D. Berman, Z. Tavorc, I. Wexlerd, N. Gabera, O. Steind, Y. Shefia, N. Poole, J. Urchse, S. Marguliese, D.S. Lieme, F. Hänggif, J. Jänckef, L. Assafb Y. (2015): Sex beyond the genitalia: The human brain mosaic.: *Proceedings of the National Academy of Sciences of the United States of America* Published online before print November 30, 2015, doi: 10.1073/pnas.1509654112. See also Daily News, New Scientist, 30 November 2015.

Kerlin, S.P. (2004) 'The Presence of Gender Dysphoria, Transsexualism, and Disorders of Sex Differentiation in Males Prenatally Exposed to Diethylstilbestrol: Initial Evidence from a 5-Year Study', *6th Annual E-Hormone Conference, October 27-30, 2004, New Orleans*, [Access date 10/10/2015]: http://www.gires.org.uk/documents/Kerlinpaper.doc

Keysers, C. and Fadiga, L. (2008), 'The mirror neuron system: New frontiers', *Social Neuroscience*, 3 (3-4): 193-198

Kipnis, K. and Diamond, M. (1998) 'Pediatric ethics and the surgical assignment of sex', *Journal of Clinical Ethics*, 9(4): 398-410.

Lewis, Marc. (2015): *"The Biology of Desire: Why Addiction Is Not a Disease":* PublicAffairs, 2015 ISBN 1610394380, 9781610394383

Meriggiola, M.C. and Gava, G. (2015) 'Endocrine care of transpeople part I. A review of cross-sex hormonal treatments, outcomes and adverse effects in transmen ', *Clinical endocrinology*, Wiley Online Library [Accessed 15/10/2-15]: http://onlinelibrary.wiley.com/doi/10.1111/cen.12753/full

Minot Presentation (2005) in *The Prague Declaration on Endocrine Disruptors meeting, June 2005* [Accessed 10/10/2015]: http://www.gires.org.uk/documents/BeyerMinotPresentation2005.doc

Money, J. (1980) *Love and Love Sickness: the Science of Sex, Gender Difference and Pair-Bonding,* Johns Hopkins University Press, 1980. ISBN 0-8018-2317-X, ISBN 0-8018-2318-8

Money, J.(1995) *Gendermaps: Social Constructionism, Feminism, and Sexosophical History* Continuum International Publishing Group; October 1995, ISBN-10: 0826408524, ISBN-13: 978-0826408525

Money, J. and Erhardt, A.A (1996) *Man and Woman, Boy and Girl: Gender Identity from Conception to Maturity* (Masterwork Series) New Edition 1 Jan. 1996, Jason Aronson Inc. ISBN-10: 1568218125 ISBN-13: 978-1568218120

Ochoa, B. (1998) 'Trauma of the External Genitalia in Children: Amputation of the Penis and Emasculation', *Journal of Neurology* 160(3-11): 1116-1119.

Pilling Report. (2013): "*Report of the House of Bishops Working Group on Human Sexuality*" (The Pilling Report) Published: 28/11/2013: Church House Publishing ISBN-13: 9780715144374 ISBN-10: 0715144375 [Accessed 20 November 2014] http://www.churchofengland.org/media/1891063/pilling_report_gs_1929_web.pdf

Pope Francis. (2016): *"Post-Synodal Apostolic Exhortation Amoris Lætitia Of The Holy Father Francis To Bishops, Priests And Deacons Consecrated Persons Christian Married Couples And All The Lay Faithful On Love In The Family":* [Accessed: 18 April 2016] https://w2.vatican.va/content/dam/francesco/pdf/apost_exhortations/documents/papa-francesco_esortazione-ap_20160319_amoris-laetitia_en.pdf

Reiner, W.G. (2004) 'Psychosexual development in genetic males assigned female: the cloacal exstrophy experience', in Diamond, M. and Yates, A. (eds.) *Child and Adolescent Clinics of North America (Sex and Gender)*, Philadelphia: W.B. Saunders, 13(3): 657–674.

Rizzolatti, G. and Fabbri-Destro, M. (2010) 'Mirror neurons: from discovery to autism', *Exp Brain Res*, 200(3-4):223-37.

Rosenthal, S.M. (2014) 'Approach to the Patient: Transgender Youth Endocrine Considerations', *Clin Endocrinol Metab*, 99(12):4379-89

Seth, Anil. (2014): “A predictive processing theory of sensorimotor contingencies: Explaining the puzzle of perceptual presence and its absence in synaesthesia”: Cognitive Neuroscience 5:2 pages 97-118: DOI:10.1080/17588928.2013.877880 ISSN: 1758-8928. [Accessed 23 June 2016]: http://www.tandfonline.com/doi/pdf/10.1080/17588928.2013.877880

Seth, Anil. (2015): “The Cybernetic Bayesian Brain: From Interoceptive Inference to Sensorimotor Contingencies”: In *Open MIND*, eds. T. Metzinger & J. Windt. Frankfurt A.M., GER: MIND group: [Accessed June 2016]: http://open-mind.net/papers/the-cybernetic-bayesian-brain .

Spiers, Helen: Hannon, Elis: Schalkwyk, Leonard C: Smith, Rebecca: Wong, Chloe C.Y: O’Donovan, Michael C: Bray, Nicholas J: and Mill Jonathan: (2015): *"Methylomic trajectories across human fetal brain development"* Genome Res. 2015. 25: 338-352: [Accessed 24/4/2016] http://genome.cshlp.org/content/25/3/338.full.pdf+html

Vatican (2013): Synod on the Family: Preparatory Document: Pastoral Challenges To The Family In The Context Of Evangelization. [Accessed 6/11/2015]: http://www.vatican.va/roman_curia/synod/documents/rc_synod_doc_20131105_iii-assemblea-sinodo-vescovi_en.html